

The exploration of the LCHF (Low Carb High Fat/)Atkins diet as a way to lose weight

Research Question: How effective is the LCHF (Low Carb High Fat/)Atkins diet on weight loss?

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Introduction

Just imagining ourselves eating fat to lose weight or to become healthy sounds bizarre, right? We always think that going on a diet consists of eating vegetables and protein, but not eating butter and avocados. Well, after reading this paper, it might just change how you perceive fats. The research question of how effective is the LCHF (Low Carb High Fat/Atkins) diet on weight loss is going to be answered in this essay. This was chosen because it was the topic that I found fascinating because I never knew that fats could be a component to losing weight. The methodology that I going to use will be to analyze two major studies regarding the LCHF(Low Fat High Carb) diet. The first study is by Foster GD, et al, professor of “Psychology in Psychiatry at the Perelman School of Medicine at the University of Pennsylvania” (Perelman School of Medicine, 2016). This study is important because it showed that the high-fat diet had a significantly greater weight loss than the high-carb diet. The other study is by Dr. Deirdre Kay Tobias, et al, instructor at Harvard Medical School in the Department of Medicine. This is also important because the results obtained from the study proved that her hypothesis which states that the high-carb diet has a greater weight loss compared to the high-fat diet was incorrect.

The History of Fats

In September 24, 1955, president Eisenhower was playing golf at his home in Denver when he suddenly collapsed from a heart attack. This incident was important because it drew attention to heart disease like never before. The increase in heart disease deaths in the 1960s was because of “an increase in smoking and dietary changes...” (Dalen, J. E, et al, 2014). Also from this incident, it made the nation think in a new way; specifically, it sparked the interest in media outlets.

In 1956, the American Heart Association brought interest to the nation by airing three television networks about a new diet to prevent heart disease: the “Prudent Diet/lipid hypothesis” (Sally Fallon and Mary G. Enig, PhD, 2000). This newly presented diet excluded red meat, butter and eggs because the scientists thought cholesterol and saturated fats will raise blood pressure, which could lead to heart disease. The lipid hypothesis consisted of “corn oil, margarine, chicken, and cold cereal” (2000). These foods were selected because they cannot build up in your arteries and cause risks of heart disease. This newly presented theory is very important because it changed the course of American diet in a way that made Americans lose the essential fats that is needed in the body.

With the concern for the prevention of heart disease, the lipid hypothesis received greater attention. In 1970, an American physiologist named Ancel Keys, from the University of Minnesota, proposed the idea that the cause of heart attacks was because of people’s lifestyle and body types. His aim was to compare seven countries’ contrasting diets regarding fats and their effect on coronary heart disease. His findings indicated that “serum cholesterol, blood pressure, diabetes and smoking are universal risk factors for coronary heart disease.” (The Seven

Countries, 1958). Also, the experiment from Dr. David Kritchevsky, “president of American Society for Nutrition” (Sally Fallon and Mary G. Enig, PhD, 2000), did an experiment on rabbits. His method was to change the diets given to the rabbits and see what happens to their arteries connected to the heart. The results showed that there were a build up of fats in arteries, tissues, and skin (2000) from diets high in saturated fats. With these results, he concluded that fats could be a potential problem of heart disease and that is why the lipid hypothesis is the safe way to avoid that disease.

The works of Keys and Kritchevsky surely were successful in popularizing the low-fat and high-carbs diets, but there were some flaws. Yerushalmy and Hilleboe, researchers who participated in the study called “ Fat in the Diet and Mortality from Heart Disease” (Yerushalmy and Hilleboe, 1957) pointed out the fact that Keys had selected the countries that would give him the results he wanted, while leaving out data from other sixteen countries that would not. (The Seven Countries, 1958) The flaws of Kritchevsky is not necessarily from his experiment but how the public understood his results. Throughout the textbook that he published called, “Cholesterol,” (Pearce, 2006), he stated that high cholesterol and high saturated fats are the potential cause of heart disease, but explained “its role in normal function, as something essential to life, and not a foreign or toxic substance.” (2006). Even though Kritchevsky stated fats are “essential” (2006) for us, the public only cared for the results from his experiment. By looking at these two studies done, the question arises of to what extent can we rely on these experiments and the perception of the public?

Like the two studies by Keys and Kritchevsky, many studies were conducted in the 1950s-1960s, making the lipid hypothesis “universally recognized as a law” (Thompson GR, et

al, 2002). Because the lipid hypothesis was now accepted by the majority of the American public, it shifted the way food production brands commercialized their foods. Proctor and Gamble, for example, sold nutritional foods that said it was low in saturated and cholesterol fats. Another example is Kellogg's and how they sold their granolas with the low-fat label in the front cover. By looking at these two food brands, we can understand that the low-fat was appealed to the general public and so they food productions continued to commercialized their foods that way. From the emphasis on the lipid hypothesis as the accepted wisdom, it changed the food production's commercializing strategies and the Americans diets.

The Different Fats

It is important to understand the three major categories of fats: bad fats, in-between fats, and good fats. When we understand what fats are good for the body and others that are harmful, we can protect our health and incorporate weight loss in a proper way. The weight loss aspect of fats will be learned from the analysis of Foster, et al, and Dr. Tobias, et al's studies.

- **Bad Fats: Trans Fats**

To start off, the bad fat is the trans fat because it reduces the amount of HDL (high-density lipoprotein) cholesterol (good cholesterol) in the body and increases the LDL (low-density lipoprotein) cholesterol (bad cholesterol) in the bloodstream. The difference between the two is that LDL "deposits its cholesterol on the walls of arteries" (Dr. David Williams, 2017) allowing it to clog up the arteries and HDL "keeps cholesterol in solution and moves it safely throughout the body" (2017). When HDL levels go down and LDL levels go up,

it increases the chance of stroke, heart disease, and type 2 diabetes. Furthermore, we have to consider the fact that “trans fats were found mainly in solid margarines and vegetable shortening” (Harvard Health, 2015), which the lipid hypothesis recommended as a solution to heart disease. From this reason, we can begin to understand that the so-called solution had a negative impact to the people’s health.

- In-between Fats: Saturated Fats

Saturated fats are considered in-between fats because they increase both LDL and HDL. Many studies have recommended to replace saturated fats with polyunsaturated and monounsaturated fats because they decrease LDL cholesterol levels while only slightly decreasing the HDL levels. Studies also recommended that consumption of saturated fats be limited it to under “10% of calories a day” (Harvard Health, 2015)

- Good fats: Monounsaturated and Polyunsaturated Fats

Monounsaturated fats

Monounsaturated fats are good for our health because they help reduce LDL cholesterol levels, which lowers the chance of any heart disease and strokes. Some examples of monounsaturated fats are “olive oil, peanut oil, canola oil, avocados, and most nuts” (Harvard Health, 2015).

Polyunsaturated fats

Polyunsaturated fats are good fats because they also lower LDL cholesterol levels. Polyunsaturated fats include omega-3 and omega-6 which are fatty acids that are essential for the body and brain. Examples of omega-3 sources are “salmon, mackerel, and sardines, flax seeds, walnuts” (Harvard Health, 2015) and examples of omega-6 sources are “vegetable oils such as safflower” (2015).

Looking at the different kinds of fats helps consumers to understand that fats are crucial for the balance of nutrients in our body, but still they should be cautious as to what benefits our health and what weakens our health.

Analysis of Two Major Studies

Study of Foster GD, et al

Gary D. Foster, Ph.D., is a professor of “Psychology in Psychiatry at the Perelman School of Medicine at the University of Pennsylvania.” (Perelman School of Medicine, 2016). In this university, he had “authored more than 175 scientific publications and three books on the etiology and treatment of obesity” (2016). “A Randomized Trial of a Low-Carbohydrate Diet for Obesity” (Foster GD, et al, 2003), the official name, was prompted because even though the high-fat, low-carb diet was gaining some attention, there was no “randomized, controlled trials [that] have [been] evaluated [to] its efficacy” (2003). This study is important because it showed that the high-fat diet led to a significantly greater weight loss than the high-carb diet.

Design and Method:

Foster GD, et al used 63 obese subjects (43 women and 20 men). All subjects completed an extensive medical examination and blood tests to see if they had any clinically significant illness like type 2 diabetes, were pregnant or taking any medication that would affect body weight. All subjects signed consent forms and the procedure was approved by the institutional review boards of the participating institutions. Then, the subjects were randomly selected by using the random-number generator to either the high-fat diet or the high-carb diet.

There were 33 subjects in the high-fat diet group. They met with a registered dietitian before the beginning the experiment in order to review the central features of the diet. In the first two weeks, the amount of carbohydrate available in their diets was limited to 20g per day, then the amount gradually increased until the desired weight was met. “Each subject was given a copy of ‘*Dr. Atkins’ New Diet Revolution*’” (Foster GD, et al, 2003). This book gave the details of the Atkins(high-fat) diet program, which the subjects had to follow.

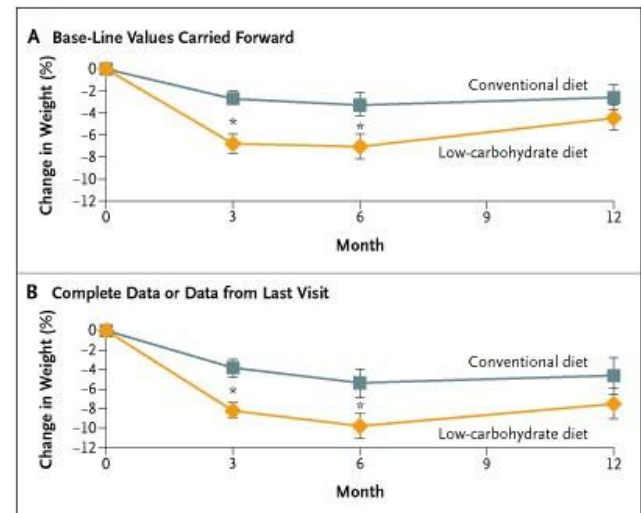
30 subjects were in the high-carbs diet group. They met with a registered dietitian also, to view the components of the high-carb diet. It was recommended for this diet, that women intake “1200 to 1500 kcal per day” (Foster GD, et al, 2003) and “1500 to 1800 kcal” (2003). The subjects were given “a copy of *The LEARN Program for Weight Management*” (2003). This manual provided 16 lessons on the different aspects of controlling weight. The instructions for the subjects were to read the manual and follow the program as instructed in the manual.

“Calibrated scales (Detecto 6800, Cardinal)” (Foster GD, et al, 2003) were used to measure body weight. The subjects were instructed to wear no shoes and light clothing from 2 to 52 weeks. *Graph 1* shows results of the study at the low-fat diet group had lost significantly

more weight than the group on the high-carb at three to six months, but it also shows that there was no significant decrease at 12 months.

Results and Conclusion:

Graph 1



<http://www.nejm.org/doi/full/10.1056/NEJMoa022207#t=articleTop>

The results showed that those on the high-fat diet had a greater weight loss than those on the high-carb for first six months, but the difference leveled out at 12 months (1 year).

The study found that long-term application to the high-fat/Atkins diet may be difficult. Due to the insignificant difference for one year, Foster GD, et al said that “longer and larger studies are required to determine the long-term safely” (Foster GD, et al, 2003) for high-fat diets and high-carb diets. Furthermore, the study focused on weight and specific risk factors for coronary heart disease by discussing the fact that replacing dietary monounsaturated and polyunsaturated fats with carbohydrates “is associated with an increased risk of coronary heart disease” (2003) and the high-fat diet was also “associated with a greater improvement in some risk factors for coronary heart disease” (2003). These health improving findings are important because it proves in this study that fats are not harmful for the body and does not make us more “fat”. Finally, Foster GD, et al stated that subjects contributed to a high attrition rate of 41% because it was a self-care experiment type with minimal supervision.

Strengths of Foster GD, et al

One of the strengths from Foster GD, et al is having a direct comparison between high-fat and high-carb. In the results it showed that the low-carbohydrate diet group had lost significantly more weight than the group on the high-carb group. This helps the readers to understand the direct comparison on weight loss for both diets. Also, the study considered ethical issues by having the subjects sign a consent form, and the protocol was approved by the institutional review boards of the participating institutions. This is a strength because all experiments that experiment on humans should always keep the ethical guidelines. In addition, Foster GD, et al added in other results aside from weight loss. This gives the impression that the high-fat diet has health benefits as well.

Another strength is when Foster GD, et al talks about his own strengths and limitations in the discussion. This helps the study to be trusted more because the researcher does not have a preconceived notion of the two diets but has a neutral point of view from his own results. In addition to trustworthiness, Foster GD, et al said that the weight losses were noteworthy because the diet was in a self-help format and subjects had little contact with health professionals. This gave a better representation of how the general population will use the high-fat diet.

Limitations of Foster GD, et al

One limitation to Foster GD, et al's study is that he had more women subjects than men. This is a drawback because there could be a difference of the effects on the two diets between genders. Also, the study does not mention the weight of the subjects and just says obese subjects. This limits the study because the standards on obesity for Foster GD, et al may be different for

other experimenters. This limitation could be improved if he used a weight scale for reference, so he could categorize the subjects as normal and obese. This way, the readers can understand what Foster GD, et al's standard was. The fact that the study could have gotten further than 12 months should also be considered because it would have been nice if the the difference after 12 months still was not significant or there were major differences. Also, looking at the subjects' age, 44.0 ± 9.4 44.2 ± 7.0 , it would have been useful to have teens and people in their 20s-30s to see if age is also a factor in the rate of weight loss. Finally, Foster GD, et al had a small sample size, so it is difficult to apply to the general population.

Study of Dr. Deirdre Kay Tobias, et al

The second study is by Dr. Deirdre Kay Tobias, et al. She is currently a instructor at Harvard Medical School in the Department of Medicine. She has “76 research items, 3,836 reads, and 4,323 citations” (Harvard Catalyst, 2018). The official title for this study is “Effect of Low-Fat vs. Other Diet Interventions on Long-Term Weight Change in Adults: A Systematic Review and Meta-Analysis” (Dr. Deirdre Kay Tobias, et al, 2015). This particular study was prompted because she wanted analyze multiple studies to see whether the high-carbs diets had a greater weight loss when compared to the high-fats diets. This study is important because it illustrates Dr. Tobias, et al's hypothesis which states that the high-carb diet has a greater weight loss compared to the high-fat diet was proven to be incorrect.

Design and Method:

Dr. Tobias, et al examined 52 trials including 68,128 subjects and did a meta-analysis comparing the two different types of diets. She used several sources to find potential trials for the

meta-analysis. She looked for trials that were greater than or equal to one year that compared high-fat and high-carb diets. Most of the trials that Dr. Tobias, et al found and used were from North America. Dr. Tobias, et al contacted the authors of the trials that she was interested in so that she could receive various measures of the trials. In the end, there were 35 trials for weight loss. Also, with the 35 trials on weight loss, there were 13 trials “with no intended intervention on weight, and 5 weight maintenance trials designed to maintain baseline body weight” (Dr. Deirdre Kay Tobias, et al, 2015) these trials provided a control group with the weight loss trials.

On the process of finding trials, Dr. Tobias, et al also excluded trials that were shorter than a year because her goal was to see a long-term effect on both these diets. She also excluded trials that had other factors involved, like non-dietary supplements that affect weight.

The two diets had different amounts of how much the subjects could consume fats so that there is a definite line between eating just carb group. It ranged from $\leq 10\%$ to $\leq 30\%$ of calories. The high-fat diet had a wider range than the high-carb diet. It varied from using instructions at the most standard level to “multicomponent programs integrating counseling sessions, regular meetings with dieticians...” (Dr. Deirdre Kay Tobias, et al, 2015).

Results and Conclusion:

The high-fat diet group had a “1.15 kg greater long-term weight loss” (Dr. Deirdre Kay Tobias, et al, 2015) when compared to the high-carb diet group. When the high-carb diet was compared to the control group it had “5.41 kg greater weight loss” (2015).

The meta-analysis of greater than and/or equal to 1 year demonstrated that high-carb diet did not have a significantly greater weight loss when compared to the high-fat diet. This proves

that Dr. Tobias, et al's hypothesis was wrong. Dr. Tobias, et al discusses how she was genuinely surprised that the results came out to be what they were because it contradicted other studies which stated that high-carb diet had more weight loss than high-fat diet. When Dr. Tobias, et al compared her meta-analysis with other studies, she found that the other studies only included trials that went as far as 6 months, which is very difficult to establish the long-term effects of the diets. With this factor of excluding trials, it is highly questionable as to whether the other studies that Dr. Tobias, et al analyzed, have accurate results that can be applied to the general population.

In conclusion, Dr. Tobias, et al's hypothesis of the high-carb diets having a bigger weight loss was proven wrong.

Strengths of Dr Deirdre K Tobias, et al

Dr. Tobias, et al had a really good sample size of having 68,128 subjects within the 52 studies. Since it has a big sample size, it can be applied to the general population. She also kept the reliability of her results by excluding trials that would skew the results from factors not part of the study. This gives more accurate data because the effect of the weight loss was not influenced by other factors.

She also had great reflections on his methods. For example, she talked about how the self-driven diet method is not the perfect measurement for weight loss, however the results for both diets revealed consistent results. This is a strength because it shows to the readers that she has a neutral standpoint toward his study. Also, the self-driven diet method is how most people would approach the diets.

In consideration to how she had control groups and calorie restrictions for the high-carb diet, she had a very clear method beforehand, which helps the readers to trust her results and conclusions more. Also, how she had examined other meta-analyses that states the high-carb diet has more of an effect on weight loss. This illustrates how the method and results are questionable, proving once again how the high-fat diets have a greater weight loss than high-carb diet.

Limitations of Dr Deirdre K Tobias, et al

One limitation in Dr. Tobias, et al, et al's study is that it does not state the specific age range and weight range of the subjects but only how many subjects there were. If there were specific weight range we could have seen a trend in the rate of weight loss versus a specific weight/age range. There is a concern on the high attrition rate because the goal was to see a variety of different people being affected by the two diets for one year. Also, the trials were limited to only America so that may limit the generalization to the world. If there were trials from different countries, there could have been a correlation between the rate of weight loss with different races and cultures. Also, "bias measures were difficult to assess as a whole" (Dr. Deirdre Kay Tobias, et al, 2015) because Dr. Tobias, et al did not have any access to the method details for "randomization and allocation concealment, and whether staff members measuring outcomes were blinded" (2015). This may decrease the reliability since there is the possibility of bias.

Similarities

Both Foster GD, et al and Dr. Tobias, et al agree that low-carb led to significantly greater weight loss than low-fat diet. In Foster GD, et al concluded that the high-fat diet group had lost significantly more weight than the high-carb diet group at three and six months. Dr. Tobias, et al study, also found that the high-fat diet group had a “1.15 kg greater long-term weight loss” (Dr. Deirdre Kay Tobias, et al, 2015) when compared to the high-carb diet group.

Also, the two studies were tested greater than or equal to one year. Foster GD, et al’s experiment was a “one-year, multicenter, randomized, controlled trial” (Foster GD, et al, 2003). Dr. Tobias, et al, also was a “long-term effect (≥ 1 year) of low-fat and higher-fat dietary interventions.” (Dr. Deirdre Kay Tobias, et al, 2015).

Furthermore, both used randomized trials. Foster GD, et al used “randomized, controlled trial” (Foster GD, et al, 2003) to define his study and Dr. Tobias, et al used the “...with dozens of randomized trials (RCTs)” (Dr. Deirdre Kay Tobias, et al, 2015).

In addition to the randomized trials, the subjects for both the studies included women and men. Foster GD, et al used “63 people(43 women and 20 men)” (Foster GD, et al, 2003) and Tobias also used various sources that included women and men as their subjects.

Conclusion

From the history of fats section, we can understand that “fats” do not necessarily make us fatter. Along with those aspects, the understanding that fats are not the reason for heart attacks, but there are other factors that goes into coronary heart disease. In the end, the analyses of Foster GD, et al and Dr. Tobias et al helped to showcase that fats are foods that our body needs to be healthy and can even help us to lose the unnecessary weight.

At the end of the analyses of the two studies, I argue for the Foster GD, et al because of his hypothesis favoring the high-fat diet having the greater impact on weight loss than the high-carb diet. This is because Foster GD, et al compares the high-fat diet with the high-carb diet, showing that it has a greater benefit in weight loss. Compared to Dr. Deirdre K Tobias, et al, a meta-analysis study that included 53 studies, Foster GD, et al’s method is much more experimental and shows the direct results from 63 subjects.

In addition, it is important to note the specific method of subjects receiving “*Dr. Atkins’ New Diet Revolution*” (Foster GD, et al, 2003) and *The LEARN Program for Weight Management*” (2003) because it is easy to know how the subjects altered their diets and relate that to the results. Also, the Foster GD, et al study gives not only the results for weight loss but went to other variables that may have a difference in the two diets. This gave a more information of the differences of health from the two diets than just weight loss. Furthermore, there was a lot reflection on why there was no significant difference of weight loss in the low-carb diet at 12 months. It gave the reason that it may due to the greater weight gain in the low-carb group and the small sample size, concluding that the long-term low-carb diet Atkins may be difficult for

some people. It also stated the fact that the answer for if the high-fat diet causes heart disease is hard to answer because of the small sample size.

To conclude, despite Dr. Tobias, et al, et al's aim to analyze multiple studies to see whether the high-carbs diets had a greater weight loss when compared to the high-fats diets, showed the results that the high-carb diet did not lead to greater weight loss when compared with the high-fat diet. Furthermore, the results in Foster GD, et al showed the same results as Dr. Tobias, et al.

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