

Participant Compliance to a Six-Month Traditional and Modified Daniel Fast

Richard J. Bloomer*, Alexandra H. Toline

Cardio Respiratory/Metabolic Laboratory, The University of Memphis, Memphis, USA

ARTICLE INFO

Article type:
Original article

Article History:
Received: 11 Aug 2014
Revised: 9 Sep 2014
Accepted: 9 Sep 2014
Published: 20 Sep 2014

Keywords:
Compliance
Dietary Restriction
Fasting
Veganism

ABSTRACT

Introduction: We have previously reported multiple health benefits in individuals following the Christian-based fasting protocol known as the Daniel Fast (DF). However, our prior work has involved only short-term (21-day) assessments. For dietary modification to have a profound impact on health, compliance to the dietary plan must be established for the long-term.

Method: We determined the 6-month compliance to a traditional (vegan) DF (n=12), as well as a modified DF (n=9; allowing for the inclusion of small amounts of meat and milk) in healthy individuals. Participants completed diet records during the study period and also rated their overall compliance to the assigned dietary plan.

Results: Compliance to both dietary plans proved to be satisfactory (approximately 80% in the 6th month; 85% in the 3rd month and 95% during the 3rd week). It is noteworthy that it did not show any major differences between groups. Body weight, from baseline toward month 6, saw a decline in participants assigned to both the traditional DF (79.6±5.3 to 75.5±5.5 kg) and the modified DF (80.4±8.0 to 74.3±6.5 kg).

Conclusion: These data indicated that both the traditional and modified DF, which involve *ad libitum* (Latin for "at liberty") feeding, are realistic for individuals to comply with over a period of several months. Such compliance is associated with a weight loss of approximately 5-8% of the body mass and considering the multi-faceted health benefits of this particular dietary approach, it may result in worthy improvements in overall health. Additional studies of the long-term health implications of this fasting method are also required.

► Please cite this paper as:

Bloomer RJ, Toline AH. Participant Compliance to a Six-Month Traditional and Modified Daniel Fast. J Fasting Health. 2014; 2(3):90-95.

Introduction

The religiously-motivated Daniel Fast (DF; Daniel 1:8-14), is a stringent plant-based diet followed by thousands of Christians each year. It has proved to be able to yield multiple health-related benefits when followed for a short period of time (for instance 21 days) (1-3).

The DF is a partial fast, in which the quantity or timing of food consumption is not controlled; however, restrictions are placed on the types of food allowed. Specifically, a traditional DF includes *ad libitum* intake of fruits, vegetables, whole grains, legumes, nuts, seeds, and healthy oils. No animal products are allowed in a traditional DF. Caffeine, alcohol, additives, and preservatives are other prohibited substances in this diet.

In our previous experiment with the DF, we noted significant reductions in total cholesterol

and low density lipoprotein (LDL-cholesterol), as well as a reduction in C-reactive protein, serum insulin and/or HOMA-IR (1-3). Moreover, we have noted a decline in the oxidative stress biomarkers, malondialdehyde (MDA) and hydrogen peroxide (H₂O₂) (4). The combination of the above improvements, along with a typical weight loss of 5-6 pounds in most individuals, may result in improved health over time. That being said, our prior experiment lasted for only 21 days; therefore, we are uncertain whether or not individuals can successfully maintain this particular diet over a prolonged period of time.

In addition, in our past studies of the DF, the main concerns of our participants during exit interviews were their interest in consuming small quantities of animal protein (meat in particular), as well as coffee and tea. These

* Corresponding author: Richard J. Bloomer, Cardio Respiratory/Metabolic Laboratory, The University of Memphis, Memphis, TN 38152, USA. Tel: 901-678-5638; Fax: 901-678-3591; Email: rbloomer@memphis.edu
© 2014 mums.ac.ir All rights reserved.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

issues were addressed in a recent study that we conducted comparing the short-term (21-day) effects of a traditional and modified DF on health markers (1).

In this trial, both groups were allowed to consume decaffeinated coffee and tea. The modified DF was identical to the traditional plan with one exception: participants were required to consume one serving of lean meat (3 ounces) and one cup of skimmed milk per day. These kinds of food provided approximately 30 grams of additional protein per day. Compared to the baseline, both the traditional and modified plan resulted in similar and significant improvements in blood lipids and also a reduction in inflammation. These findings lead us to conclude that modification of dietary intake in accordance with either a traditional or modified DF may improve a variety of cardiovascular and metabolic disease risk factors. Consequently, we acknowledge that further research is needed to be conducted to determine the long-term health benefits of such plans. Most importantly, the long-term compliance of individuals following such an approach within a free-living environment is vital.

In general, in the present study we determined the 6-month compliance to both a traditional and modified DF in a group of healthy individuals. If subjects' overall compliance to the dietary prescription was noted to be high in this study, further evidence of longer durations would be logical in an attempt to determine the long-term health implications of this fasting method.

Materials and Method

Research Design

This study examined the self-reported compliance of the participants who had been assigned to either a traditional or modified DF over a period of 6 months.

Participants

Twenty-one healthy men (n=7) and women (n=14) between the ages of 18 and 70 years completed the entire 6-month intervention. Participants were not current smokers and most of them were physically active, engaged in a regular exercise program. Health history, medication and dietary supplement usage and physical activity questionnaires were completed

by all participants. Each participant was informed of all procedures, potential risks, and benefits associated with the study through a written form in accordance with the procedures approved by the University of Memphis (USA) Institutional Review Board for Human Subjects Research. All participants provided us with a written consent prior to being admitted.

Dietary Plan Assignment

Following screening procedures, participants were assigned to either a traditional DF (vegan-based diet; n=12) or a modified DF (n=9) inclusive of one serving of meat (3 ounces of chicken, fish, beef, pork, or turkey) and skimmed milk (8 ounces) per day.

Following the initial week of dietary recording and all baseline assessments, participants followed their group assignment for 6 months. In both groups, participants were provided with an outline of the food which was routinely allowed, as well as foods which should not be consumed while following the assigned plans. For the sake of simplicity, participants were told that the diet plans consisted of fruits and vegetables, nuts, seeds, legumes, vegetables, oil, and whole grains. In short, no additives, preservatives, flavoring, caffeine, or alcohol were permitted. Thus, participants were allowed to drink decaffeinated coffee and tea, as well as water. This applied to participants in both plans (traditional and modified DF).

Those participants assigned to the traditional DF were not allowed to consume any animal products, while participants assigned to the modified DF were required to consume one serving of lean meat (3 ounces) and one serving of skimmed milk (8 ounces) per day. The investigators used food models to help participants develop a better understanding of portion sizes—in order to help with dietary recording and adherence to the assigned plan.

Compliance Assessment, Dietary Recording and Questionnaires

Participants were required to report to the lab at the baseline and within the upcoming 3 weeks, 3 months and 6 months of following the dietary guidelines in order to measure their compliance. Specifically, participants were asked to rate compliance to the fast on a scale of (0-100%). Their judgment had to be based on their food

choices, use of additives, preservatives, flavoring and caffeine during the preceding time period in which they were following the fasting plan. In addition, participants' body weight was measured at each laboratory visit (baseline, end of week 3, end of months 3 and 6) using a medical scale. This was done to provide support for the self-reported compliance values.

Participants also recorded all the food and drink consumed during the one-week period prior to reporting to the lab at baseline, week 3, month 3 and month 6. Dietary records were analyzed on the basis of kilocalorie content (Food Processor V9, 2006 ESHA Research, Salem, OR). In addition, participants replied to a series of open-ended questions which allowed them to express their overall thoughts related to the dietary plan.

Results

A total of 28 individuals provided us with a written consent and began the 6-month intervention study. However, three participants in the traditional DF group and four in the modified DF group halted their participation for personal reasons. Therefore, only a total of 21 participants completed the entire 6-month intervention. The only data illustrated here are for those individuals who completed the experiment successfully.

As we have noted in our previous experiment with the DF, total kilocalorie intake was reduced from baseline and this was the case in both dietary groups. The kilocalorie intake of participants in the traditional DF group specifically decreased from 2018±268 to 1368±114 from baseline to month 6; an approximate 32% reduction. The kilocalorie intake of participants in the modified DF group declined from 1978±213 to 1554±228 from baseline to month 6, an approximate 21% reduction. Quite expectedly, body weight saw a decrease from baseline to month 6 in participants assigned to both the traditional DF (79.6±5.3 to 75.5±5.5 kg) and the modified DF (80.4±8.0 to 74.3±6.5 kg); and approximate 5% and 8% reduction, respectively.

Compliance was noted to be remarkable for both dietary plans and it did not differ significantly from one group to the other. Data are provided in Table 1. Table 2 includes participants' solicited comments related to

Table 1. Participant self-reported compliance (percentage) to a traditional and modified Daniel Fast

	Week 3	Month 3	Month 6
Traditional DF (n=12)	96.0±1.1	84.6±2.6	80.0±3.2
Modified DF (n=9)	94.7±3.1	87.3±2.8	82.6±4.2

compliance and difficulty in following the assigned dietary plan throughout the 6 month period.

Discussion

To the best of our knowledge, this is the first study to assess the long-term compliance of the DF. Although our prior study, using this dietary restriction model, came out with excellent participant compliance, these studies only lasted for a period of 21 days (1-3). The present findings are encouraging in that individuals appear to tolerate the DF plan very well, whether inclusive of animal protein or not. Participants commented that they were very pleased with the dietary plan and many believed that their overall outlook on food changed as a result of following this plan for the 6-month period. Individuals also commented on the fact that their overall nutritional knowledge has increased as a result of their participation. Based on the potential for this plan to improve nutrition knowledge and motivate people to consume healthier food, further studies are needed to determine the long-term impact of this dietary model on health outcomes.

We believe that the *ad libitum* nature of the dietary plans was partly responsible for the high compliance rate. Interestingly, even with *ad libitum* feeding, total kilocalorie intake was reduced by 20-30%. It is likely that the high nutrient density of the chosen foods and the lack of "empty calories" in both plans may have favorably impacted satiety. Discussions with participants made it clear that many individuals regularly consumed processed food while following their usual diet plan, which might have led to a higher intake of calories. When embarking on the DF plan, they replaced processed food with more wholesome, natural alternatives that created greater satiety and thus, led to a reduction in their total calorie intake.

Participants repeatedly reported that the plans were relatively easy to follow, with multiple food options for both meals and snacks. This is not the case for many dietary programs,

Table 2. Solicited participant comments after 6 months of following a traditional or modified Daniel Fast

Group	Comment(s)
Traditional DF	<i>Most Challenging:</i> Family members not eating the same foods. <i>Enjoy Most:</i> Improved health. <i>Overall Experience:</i> This is my 3rd Daniel Fast. I am thankful for the positive impact it has had on my overall health.
Traditional DF	<i>Most Challenging:</i> The first 3 weeks of the study were extremely difficult. 100% compliance was draining mentally, physically, & financially. <i>Enjoy Most:</i> My health consciousness has increased along with energy. <i>Overall Experience:</i> Overall, I am pleased with the results of the fast. I am more mindful of what I eat & I feel better.
Traditional DF	<i>Most Challenging:</i> Coming up with different recipes. <i>Enjoy Most:</i> Learning & reading about what these additives, preservatives, etc. do to the body. This has been like a college course to me. It also has led me to study side effects of my husband's medications he is taking and has inspired more holistic thinking on his part. <i>Overall Experience:</i> Overall, this was a fantastic experience. I am so honored to have been a part of it. My sons actually would provide me with links to more healthful eating. It gave us more common ground.
Traditional DF	<i>Most Challenging:</i> No fish. <i>Enjoy Most:</i> Healthy feeling. <i>Overall Experience:</i> I had a positive experience that affected everyone around me. I believe that we all learned that the Bible is real & true.
Traditional DF	<i>Most Challenging:</i> Finding foods without additives & preservatives. Making meals interesting with different recipes. <i>Enjoy Most:</i> Easy weight loss. <i>Overall Experience:</i> Great experience. So glad I participated. It changed the way I look at food & dieting. I will be more aware of additives/preservatives in food.
Traditional DF	<i>Most Challenging:</i> Avoiding fish & cheese altogether, especially the fish, which I ate several times a week before the diet started. The cheese was far less of a challenge to avoid. <i>Enjoy Most:</i> Have my progress monitored. I do really believe I would have done much better if closer monitoring were part of the fast research program.
Traditional DF	<i>Most Challenging:</i> Not being able to just warm something up every day without cooking. Also not being able to just grab a snack & go. <i>Enjoy Most:</i> Becoming healthier and learning how to somewhat manage a long term eating plan. <i>Overall Experience:</i> I had a good experience while on the Daniel Fast.
Traditional DF	<i>Most Challenging:</i> Eating out; did not enjoy eating out at all. <i>Enjoy Most:</i> Eating healthier, feeling better, getting in more vegetables. Talking to people about it. <i>Overall Experience:</i> It was really great. I had support from my spouse, but towards the end he was complaining and that did not help.
Traditional DF	<i>Most Challenging:</i> Stopping animal products like cheese, curd, & milk. <i>Enjoy Most:</i> Healthier diet than regular. <i>Overall Experience:</i> Daniel Fast is good & healthier choice over normal diet.
Traditional DF	<i>Most Challenging:</i> No meats, no sugars. <i>Enjoy Most:</i> Overall it was good.
Traditional DF	<i>Most Challenging:</i> No fish, no sweets. <i>Enjoy Most:</i> Felt good, lost weight. <i>Overall Experience:</i> My mind & heart certainly wanted to do it more than my body. Sometimes the body won over, but overall the discipline was there & good for me.
Modified DF	<i>Most challenging:</i> A lack of "cheat meals" built into the plan. <i>Overall Experience:</i> Very good. If people would adopt this eating approach (or something very similar), we would not have a health crisis in our nation.
Modified DF	<i>Most challenging:</i> Consuming meat every day. Difficult to comply on the holidays. Too much time prepping foods but worth it in the end. <i>Overall Experience:</i> Positive. I feel nervous going off - I do not want to gain weight back.
Modified DF	<i>Most challenging:</i> The holiday season and travel. <i>Enjoy most:</i> Overall feeling - less tired. <i>Overall Experience:</i> Great experience - would do it again.
Modified DF	<i>Most Challenging:</i> Learning to plan out my meals. <i>Enjoy most:</i> Learning new recipes, feeling better physically & emotionally. <i>Overall Experience:</i> While it was hard, I really enjoyed it because of how it made me feel. I even learned a little about time management & how to cook more.
Modified DF	<i>Most Challenging:</i> Figuring out a routine for shopping/preparing/planning foods (because convenience foods are generally not usable). <i>Enjoy Most:</i> Sense of eliminating/reducing additive & excessive fat/carbs. <i>Overall Experience:</i> Generally very positive because I learned a new way to think about food & nutrients.
Modified DF	<i>Most Challenging:</i> Keeping fresh foods available with my schedule. <i>Enjoy Most:</i> Fruits. <i>Overall Experience:</i> This has been a very positive experience, learning about new ways to cook & enjoy more nutritious foods.

Table 2. Solicited participant comments after 6 months of following a traditional or modified Daniel Fast (Continued)

Modified DF	<i>Most Challenging:</i> Traveling and eating out. Also, monthly cycle of non-compliant eating (hormones?). <i>Enjoy Most:</i> The fruit! <i>Overall Experience:</i> Really enjoyed the experience.
Modified DF	<i>Most Challenging:</i> Finding food choices easily. <i>Enjoy Most:</i> Improves my energy level! <i>Overall Experience:</i> Overall very positive! More contact with participants would probably help them be more compliant.
Modified DF	<i>Most Challenging:</i> Being in social situations with food around. I always wanted to cheat in social situations. <i>Enjoy Most:</i> Eating healthy, lower grocery bill. <i>Overall Experience:</i> It was great. I am very pleased with the results.

as restrictions are placed on both the type and quantity of the food consumed, and sometimes on the times of daily meals.

Greaves and colleagues made several observations on the potential barriers to dietary compliance. They noted a number of reasons for individuals' non-compliance; for instance unwillingness (48.6%), having difficulty in adhering to a diet different from that of the rest of the family (30.2%), and being in social gatherings (13.7%) (5). Similar responses have been reported by another group, claiming that a lack of compliance in patients following a cholesterol-lowering diet was due to "already having satisfactory food habits", "unwillingness to suffer nutritional deprivation" and "difficulties in conciliating a diet with family life" (6).

When it comes to overall compliance, participants who adhered to the assigned plans lost between 4-6 kg of their body mass on average, which has been known to be "clinically meaningful" (5). It is possible that a longer-term intervention might yield even greater weight loss. This would need to be determined through further investigations.

Our compliance values (Table 1) are impressive when compared to other dietary programs over similar periods of time. For instance, participants following one of the four popular weight loss plans (Atkins, Zone, Weight Watchers, and Ornish) self-reported their compliance rates in two-month intervals throughout the one-year study (7). Compliance was rated on a scale of 1 (none) to 10 (perfect). As the study progressed, participant compliance with all four diets gradually decreased to a value of approximately 4/10 by the 6th month. A drop in compliance level is quite typical with dietary plans and was observed in the present study as well (Table 1). However, our participants reported an approximate 80% compliance by the 6th month, which is far higher than most individuals following one of the more popular "weight loss" diets (7). The authors in the

Dansinger et al. study (7) mentioned that approximately 25% of participants in each diet group sustained a mean adherence level of at least 6 of 10, which appeared to delineate a clinically meaningful adherence level. Assuming that the given fact is accurate, it might be hypothesized that participants in our study, who reported a mean compliance rate of approximately 80% by the 6th month, might realize significant clinical outcomes regarding their overall health. Of paramount importance to our overall compliance values is the fact that participants in our study appeared motivated to make a change in lifestyle, something which is absolutely crucial if success is expected (8).

Conclusion

For the first time, we report that individuals following either a traditional or a modified DF for a period of 6 months can comply to our dietary plan with a high degree of success. The rampant increase in obesity, type II diabetes and cardiovascular diseases in the United States and other countries around the world, emphasizes the importance of determining a dietary approach which can result in positive health outcomes and is, at the same time, reasonable to follow. Our previous experiment with the DF, along with the present data pertaining to long-term compliance, indicate that this plan might be a good stepping stone for many individuals aspiring to become healthier through dietary intake. Further studies involving a longer time-course of intervention, as well as multiple health-related outcome measures, are required to confirm this hypothesis.

Acknowledgement

This experiment was funded by the University of Memphis, U.S.A.

References

1. Alleman RJ, Harvey IC, Farney TM, Bloomer RJ. Both a traditional and modified Daniel Fast

- improve the cardio-metabolic profile in men and women. *Lipids Health Dis.* 2013; 12(1):114.
2. Trepanowski JF, Kabir MM, Alleman RJ Jr, Bloomer RJ. A 21-day Daniel fast with or without krill oil supplementation improves anthropometric parameters and the cardiometabolic profile in men and women. *Nutr Metab (Lond)*. 2012; 9(1):82.
 3. Bloomer RJ, Kabir MM, Canale RE, Trepanowski JF, Marshall KE, Farney TM, et al. Effect of a 21 day Daniel Fast on metabolic and cardiovascular disease risk factors in men and women. *Lipids Health Dis.* 2010; 9:94.
 4. Bloomer RJ, Kabir MM, Trepanowski JF, Canale RE, Farney TM. A 21 day Daniel Fast improves selected biomarkers of antioxidant status and oxidative stress in men and women. *Nutr Metab (Lond)*. 2011; 8:17.
 5. Greaves CJ, Sheppard KE, Abraham C, Hardeman W, Roden M, Evans PH, et al. IMAGE Study Group. Systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. *BMC Public Health.* 2011; 11:119.
 6. Bruckert E, Pouchain D, Auboiron S, Mulet C. Cross-analysis of dietary prescriptions and adherence in 356 hypercholesterolaemic patients. *Arch Cardiovasc Dis.* 2012; 105(11):557-65.
 7. Dansinger ML, Gleason JA, Griffith JL, Selker HP, Schaefer EJ. Comparison of the Atkins, Ornish, Weight Watchers, and Zone diets for weight loss and heart disease risk reduction: a randomized trial. *JAMA.* 2005; 293(1):43-53.
 8. Toth-Capelli KM, Brawer R, Plumb J, Daskalakis C. Stage of change and other predictors of participant retention in a behavioral weight management program in primary care. *Health Promot Pract.* 2013; 14(3):441-50.