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The Effect of Weekly Family Home Evening Nutrition
Lessons on Nutritional Behavior in
Latter-day Saint Families

Jacquelyn H. Packard

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

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April 2010

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ABSTRACT

The Effect of Weekly Family Home Evening Nutrition

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Latter-day Saint Families

Jacquelyn H. Packard

Department of Exercise Sciences

Master of Science

Latter-day Saint (LDS) families with two parents and two children between the ages of 6-16 were recruited to participate in a weekly nutrition Family Home Evening (FHE) study and randomized into either a control group or an intervention group. Each family had to complete a nutrition screener prior to and after completing 6 weekly FHE lessons in the family's home environment. Online nutritional instruction was given to the intervention group for their FHE lessons, while the control group studied typical religious topics. Data taken from the nutrition screener were collapsed into a healthy or unhealthy diet score by averaging scores for questions relating to healthy or unhealthy food practices respectively. The question responses were based on a Likert-type scale ranging from 1 being less than once per week to 6 being 2+ times per day relative to specific type of food consumption.

In the healthy diet profile intervention group ($n = 64$), parents started at 2.6 or just greater than once a week and increased to 3.0 or as much as 3 times a week. The children increased from 2.3 or slightly more than once a week to 2.7 or nearly 2-3 times per week. The overall effect was significant for parents and children ($p < .001$). These results suggest the intervention group increased eating healthy foods such as fruits, vegetables, and whole grain from just greater than once per week to as much as 3 times per week, a 50% increase, in response to the nutritional FHE lessons. The parents started and ended with higher scores than the children, however, the overall increase in scores was similar. In the unhealthy diet profile ($n = 33$), no significant change was observed between the control and intervention groups.

Results of this study suggest that FHE may be an effective tool for improving nutritional behavior in LDS families. Family-based interventions using religious organizations seem to be a promising channel for implementing healthy behavior change.

Keywords: nutrition, intervention, family, LDS, religious

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The Effect of Weekly Family Home Evening
Nutrition Lessons on Nutritional Behavior
in Latter-day Saint Families

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Abstract

Latter-day Saint (LDS) families with two parents and two children between the ages of 6-16 were recruited to participate in a weekly nutrition Family Home Evening (FHE) study and randomized into either a control group or an intervention group. Each family had to complete a nutrition screener prior to and after completing 6 weekly FHE lessons in the family's home environment. Online nutritional instruction was given to the intervention group for their FHE lessons, while the control group studied typical religious topics. Data taken from the nutrition screener were collapsed into a healthy or unhealthy diet score by averaging scores for questions relating to healthy or unhealthy food practices respectively. The question responses were based on a Likert-type scale ranging from 1 being less than once per week to 6 being 2+ times per day relative to specific type of food consumption.

In the healthy diet profile intervention group ($n = 64$), parents started at 2.6 or just greater than once a week and increased to 3.0 or as much as 3 times a week. The children increased from 2.3 or slightly more than once a week to 2.7 or nearly 2-3 times per week. The overall effect was significant for parents and children ($p < .001$). These results suggest the intervention group increased eating healthy foods such as fruits, vegetables, and whole grain from just greater than once per week to as much as 3 times per week, a 50% increase, in response to the nutritional FHE lessons. The parents started and ended with higher scores than the children, however, the overall increase in scores was similar. In the unhealthy diet profile ($n = 33$), no significant change was observed between the control and intervention groups.

Results of this study suggest that FHE may be an effective tool for improving nutritional behavior in LDS families. Family-based interventions using religious organizations seem to be a promising channel for implementing healthy behavior change.

Introduction

Diets high in whole grains, fruits and vegetables are associated with lower risk of cardiovascular disease (CVD), cancer, and stroke (Bruce, Spiller, Klavey, & Gallagher, 2000; Steffen et al., 2003). Also, diets rich in whole foods are correlated with reduced rates of chronic diseases such as diabetes and obesity (Adams & Standridge, 2006). Although eating whole grains, fruits, and vegetables provide protection against a variety of diseases, sufficient intakes of such foods is limited in many American diets (Cleveland, Moshfegh, Albertson, & Goldman, 2000; Ellis, Johnson, Fischer, & Hargrove, 2005). Conversely, unhealthy fats and sugars contribute a significant amount of the calories in the average diet (Bachman, Reedy, Subar, & Krebs-Smith, 2008).

Many strategies targeting improved nutrition have been implemented in schools and worksites. These nutrition approaches, while temporarily successful during the intervention, have not seemed to have a significant impact on national obesity and disease statistics (Beresford et al., 2001; Howerton et al., 2007; Te Velde et al., 2008). Good nutrition has, however, been attributed to home availability of healthy food choices and family social support (Jago, Baranowski, & Baranoski, 2007; Larson, Neumark-Sztainer, Hannan, & Story, 2007). Furthermore, parental modeling has been shown to effectively change children's intake of fruits and vegetables (Pearson, Biddle, & Gorely, 2008). This evidence suggests that families would be a sensible focus when attempting to change dietary habits. Because religious organizations often consist of family-based memberships, they might plausibly be a better conduit than schools or worksites for changing dietary patterns in a family setting.

Utilizing churches to promote health is not a novel concept. Black church settings have been studied for improving nutrition and physical activity habits (Resnicow et al, 2004;

Resnicow et al., 2001). Additionally, Seventh-Day Adventist churches (Singh, Linsted, & Fraser, 1999; Singh, Sabaté, & Fraser, 2003) and The Church of Jesus Christ of Latter-day Saints (LDS; Merrill & Lyon, 2005; Merrill, Hilton, & Daniels, 2003) have also been studied because of their unique doctrinal beliefs regarding nutrition and the health benefits members have reaped because of their characteristic lifestyles.

Although abstaining from alcohol, tobacco, and tea as outlined in the LDS Church's Word of Wisdom (The Church of Jesus Christ of Latter-day Saints, 1981) have been beneficial to LDS health in general (Merrill & Lyon, 2005; Merrill et al., 2003), LDS church members in Utah are becoming increasingly susceptible to obesity (Merrill & Hillam, 2006) and its associated diseases due to unhealthy nutrition choices and too little exercise (Merrill & Thygeson, 2001) when compared to members of other religious affiliations in Utah. The Word of Wisdom's additional recommendations of consuming whole foods, limiting amounts of meat consumption and taking care of the body in general needs to be brought to the attention of LDS members, or obesity rates may soon mimic the general population.

The common practice of Family Home Evening (FHE) in the LDS culture may make it possible to reach large numbers of LDS families for the purpose of teaching and establishing healthy behaviors. Family Home Evening is a regular night of family instruction for the purpose of uniting and strengthening families and presents a weekly opportunity to learn about spiritual and secular topics (The Church of Jesus Christ of Latter-day Saints, 2008). While FHE instruction is generally focused on religious instruction, LDS families could possibly use this designated time to learn about the health of their bodies through diet and nutrition principles.

This study sought to evaluate the feasibility of using a pre-established religious program, FHE, as a way of teaching and modifying dietary behaviors in the LDS population. By teaching

families about healthy nutrition habits based on the most current nutrition research, as well as the less observed aspects of the Word of Wisdom, dietary knowledge and subsequently nutrition behavior may improve. If this method effectively teaches and changes dietary behavior in a LDS sample, the information might be implemented on a wider scale to help LDS families change their dietary lifestyles for the purpose of improving health and reducing risk of disease. There may also be implications for this approach in other religious organizations and families as a whole, regardless of religious affiliation.

Methods

Participants

Seventy-six LDS families residing in Central Utah were recruited by flyers, word of mouth, and referrals. All participating families consisted of two parents with at least two children living at home between the ages of 6 and 16. To participate in this study, each family agreed to pre-intervention testing, holding FHE once a week for six weeks to present the lesson material provided, and post-intervention testing.

Permission to use the families as part of this study was obtained from the university internal review board. Consent/assent forms authorizing participation were e-mailed to each family and posted on the lesson Web site. Consent/assent was implied if participants completed the pretest survey. Parents were also instructed to read the assent information to their children.

Study Design and Materials

After applying inclusion and exclusion criteria and providing additional information regarding the details of the study to the original 76 families, 44 remaining families agreed to participate in the study. Families for the study were randomly placed into two groups: a nutrition

intervention group ($n = 27$) and a control group ($n = 17$). Before the study began, families received an instructional e-mail outlining the study procedures.

Before families were given access to the online FHE lessons, each eligible family member was required to complete an online nutrition screener (Block, Gillespie, Rosenbaum, & Jenson, 2000) to assess nutritional habits. Parents assisted younger children in completing the nutrition screener accurately. After its completion, families in both groups were given six weekly lessons to complete during weekly FHE. The 27 families assigned to the intervention group were given the six lessons that focused on healthy nutrition habits. The lessons were constructed by the researchers using current nutrition dietary guidelines, including current research findings and material from the Word of Wisdom. All lesson material was available online (Nutrition FHE Lessons, 2009) and could be printed out in preparation for teaching the lessons. The weekly lesson topic for each FHE is presented in Table 1. In the control group, the 17 families were assigned lessons from the Church's FHE manual for their six weeks of FHE lessons on their own separate Web site. These lessons were essentially what the family was already doing for FHE every week, but they were still presented online to promote a similar experience between intervention and control and eliminate potential treatment effects.

After each lesson, all families completed a brief survey asking about the quality of the FHE and for a list of the family members who attended that week. To promote compliance in both groups, a weekly e-mail with links to the lessons was sent as a reminder to conduct FHE.

All FHEs followed the typical layout of a song, prayer, lesson, activity, and refreshment. The researchers were available via telephone and email to help clarify any material that needed further explanation for the groups. All lessons were presented in consecutive order. If a family missed a lesson, they were given an extra week to complete it. After each family completed the

six lessons the groups again completed the nutrition screener. The duration of the study was eight to nine weeks long, with a total time commitment of about 10 hours. Because of continuous recruitment starting times for the study varied by family, with the first families beginning April 20, 2009 and the last families beginning June 7, 2009. At any given time during the study, participation included both control and intervention families. After the completion of study, the families in both groups were given access to both of the family home evening lesson Web sites.

Statistical Analysis

The primary outcome variable was improvement in nutrition behavior determined by comparing the pre- and posttest nutrition screener scores. Data were analyzed using a linear mixed model to appropriately account for family variability as well as random error. The lmer function in the lme4 library in the computer package R (2009) was used for computation. Fixed effects included the intercepts for each treatment by gender by parent combination (intercepts were scores at pretest), and the slopes for each treatment by gender by parent combination (slopes were the pretest to posttest differences). Tests for significance were made using Likelihood Ratio Tests when the models were appropriately nested, and individually constructed *F* tests within a given model. Statistical significance was set at $p < .05$.

Results

Data Treatment

Within the 44 families that completed the study, there were 97 complete individual sets of pretest and posttest data for parents and children (intervention $n = 64$, control $n = 33$). Data taken from the nutrition screener were collapsed into a healthy diet score which consisted of averaging scores for questions relating to healthy food practices including fruit, vegetable, and

whole grain consumption. An unhealthy diet score was also computed by averaging scores relating to unhealthy nutrition practices including high fat meat and dairy, snack, and fried food consumption. The question responses were based on a Likert-type scale ranging from 1 being less than once per week to 6 being 2+ times per day.

Because this study included participants who were members of the same family with same group assignment (intervention parents and children, control parents and children) it was necessary to control for the effect of family variability and random error. The effect of gender was also examined.

Descriptive Data

The average age of adults in the intervention was 40.9 years ($SD = 7.4$; range = 30–61) and 39.7 years ($SD = 9.14$; range = 28–62) in the control group. Children's average age was 11.1 years ($SD = 3.99$; range = 5–18) and 11.8 years ($SD = 4.10$; range = 6–18) in the intervention and control groups respectively. In the intervention group, 64% were female and 76% were female in the control (see Table 2).

Healthy Diet Score

Healthy diet score analyses showed an effect for parents and children at the intercept in both intervention and control groups, meaning that parent scores were different than the children in the pretest ($p < .001$). However, the change or slope from pretest to posttest between parents and children was not significant ($p = .19$) indicating that change in scores for parents and children in each group was not different from each other. No gender effect was observed ($p = .28$).

In the healthy diet score intervention group ($n = 64$), parents started at 2.6 or a consumption of healthy foods 1.5 times a week and increased to 3.0 or as much as 3 times a

week. The children increased from 2.3 or once a week consumption of healthy foods to 2.7 or nearly 2-3 times per week ($p < .001$). The slope from pretest to posttest in the intervention was significant ($p < .001$). In the control group, the parents pretest score was 2.9 and decreased to 2.7 at posttest, and the children's scores changed from 2.5 at pretest to 2.3 at posttest. However, the negative slope in healthy eating was not significant. The intercept was also not significantly different for the control group and intervention group ($p = .23$), meaning that the groups did not start at different points in the pretest (see Figure 1 and Table 3).

Unhealthy Diet Score

Using the same model as the healthy diet analyses, the unhealthy diet analyses showed only a slight parent-child effect in both groups with respect to intercepts ($p = .09$). The slope was not different between parents and children ($p = .34$). No gender effect was noted ($p = .99$).

In the intervention group, parents pretest scores were 2.2 or just over once a week and decreased to 2.1 or about once a week in the posttest suggesting a favorable yet nonsignificant trend for decreasing unhealthy food consumption. For the children, pretest scores decreased from 2.4 to 2.3 in the posttest moving slightly toward the once a week direction and were also not significant. In the control group, the parents pretest scores were 2.2 and slightly increased to 2.5 in the posttest, and the children went from 2.2 in the pretest to 2.5 at the posttest measurement. Even with a negative slope for the intervention group and a positive slope for the control group, the change in eating unhealthy foods was not statistically significant ($p = .25$). The control group and intervention group also did not start with significantly different scores ($p = .13$) in the unhealthy diet profile (see Figure 2 and Table 3).

Discussion

This study showed that using FHE may be an effective way to modify dietary behaviors in an LDS population. After completing the FHE lessons, the families in the intervention group increased their intake of healthy foods (2.6 vs 3.0). These results are impressive once properly put into context. The question responses were based on a Likert-type scale ranging from 1 being less than once per week to 6 being 2+ times per day. Parents increased eating healthy foods such as fruits, vegetables, and whole grain from about 1.5 times per week to as much as 3 times per week, or a 50% increase in the total consumption of healthy foods. The children also increased (2.33 vs 2.71) in a similar fashion as parents. While the child scores were not as high as the parents in the pretest or posttest, the change in slope was the same in terms of total improvement.

The results for the unhealthy diet score were not statistically significant, but the trends seen are worthy of consideration. The weekly lessons seemed to help the intervention group make better choices in regard to unhealthy food than the control group and may have prevented the intervention from increasing unhealthy food consumption. One explanation as to why the unhealthy diet change was not as dramatic as the healthy diet change could be that changing poor habits is more difficult than implementing new healthy behaviors. Another reason might be attributed to the lesson on fat and high fat foods being 4th in the series of 6 FHE lessons.

These results support the notion that families can be an effective medium for improving dietary habits. Home availability of nutritious food (Jago et al., 2007) and family social support (Larson et al., 2007) is critical when trying to influence nutrition. One way to increase whole food intake is to change the home environment. Creating a setting with ample availability to healthy foods has been shown to increase the amount that fruits, vegetables, and whole grains that are consumed. A review of several qualitative studies conducted among children and adults

indicated that greater availability was associated with greater consumption (Jago et al., 2007). Availability was associated with dietary variables such as preferences in cross-sectional studies. Intervention studies attempting to increase availability have resulted in increased consumption, and availability has predicted change in consumption over an 18-month period (Jago et al., 2007). This study is also in agreement with other studies that use religious organizations as a method to affect family-based behavior (Resnicow et al, 2004; Resnicow et al., 2001).

Because this study was only six weeks long and considered only acute effects on eating habits, it is difficult to generalize the long-term effects of the FHE lessons. Follow-up testing at 6 months or 12 months subsequent to the initial testing would be necessary to consider the long-term effects of the lessons. Also, nutrition was heavily emphasized during the 6 week intervention, and it may be that participants who did not change during the study will make future changes to their dietary habits because they now feel it is important. Additionally, material presented late in the series of lessons might not lead to behavior change in the immediate future but produce changes in future long-term eating habits. Our results suggest that FHE lessons presented in a family environment can have an effect on improving eating behavior in LDS families. To make the lessons more enduring, possible solutions could include further nutritional intervention during Sunday classes and establishing a LDS Church-wide nutritional directive.

While the study was well designed and positive feedback was received by the majority of the participants, steps should be explored to increase family retention and participation. One possible change in study methodology could be to change from a completely electronic delivery. While there were many benefits of designing the study with this arrangement, families might be more likely to complete or comply with lesson material if they were given materials to study in

paper form and also if they had a personal face-to-face contact. However, lessons were formatted such that they could be easily printed off and contact with the researchers readily available through email and phone. Other issues to consider are lesson content, timing of lessons, and including other health topics with the lessons. Even though lessons were intentionally written for a broad range of ages, in personal communication some parents commented that the lessons were too simplistic for their older children. Others commented that it was hard to complete the lessons on a weekly basis due to overly busy schedules. Also, the lessons might have had amplified results if nutrition information was paired with physical activity and other health-related topics.

Conclusion

This study provides evidence for promoting healthy behaviors, particularly nutrition, in a family setting. A family-based approach may provide a means for promoting widespread improvements in health by using the family unit as a center for learning.

The results of this study also indicate that the FHE program in the LDS Church is an effective method for helping people to improve their nutrition habits. Future research should continue to explore the practicality and effectiveness of using religious influences and family-based programs to promote healthy lifestyle change within a family setting.

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Table 1

Lesson Topics*

1. Caring for our mortal bodies
2. How does your nutrition stack up?
3. Focusing on the “do’s”
4. Heart healthy: Types of fat
5. Variety is key
6. Sticking with it

*lessons can be accessed at the following website:

<http://sites.google.com/site/nutritionfhelessons/Home>

Table 2

Participant Descriptive Statistics

		Intervention			Control		
Gender		(female = 64%)			(female = 76%)		
Total n		64			33		
Adults	Range	M	\pm SD	Range	M	\pm SD	
age in years	30 – 61	40.94	\pm 7.40	28 – 62	39.71	\pm 9.14	
Children	Range	M	\pm SD	Range	M	\pm SD	
age in years	6 – 16	11.10	\pm 3.99	6 – 16	11.77	\pm 4.10	

Table 3

Average Diet Scores

	Intervention		Control	
	Pretest	Posttest	Pretest	Posttest
Adults				
Healthy Diet	2.6 [^]	3.0*	2.9 [^]	2.7
Unhealthy Diet	2.2 [^]	2.1	2.2 [^]	2.5
Children				
Healthy Diet	2.3 [^]	2.7*	2.5 [^]	2.3
Unhealthy Diet	2.4 [^]	2.3	2.2 [^]	2.5

Notes: *Significant change in healthy diet score. [^]Intercepts were not significantly different. A score of 2 indicates consuming foods an average of once a week; a score of 3 indicates consuming foods an average of two to three times a week.

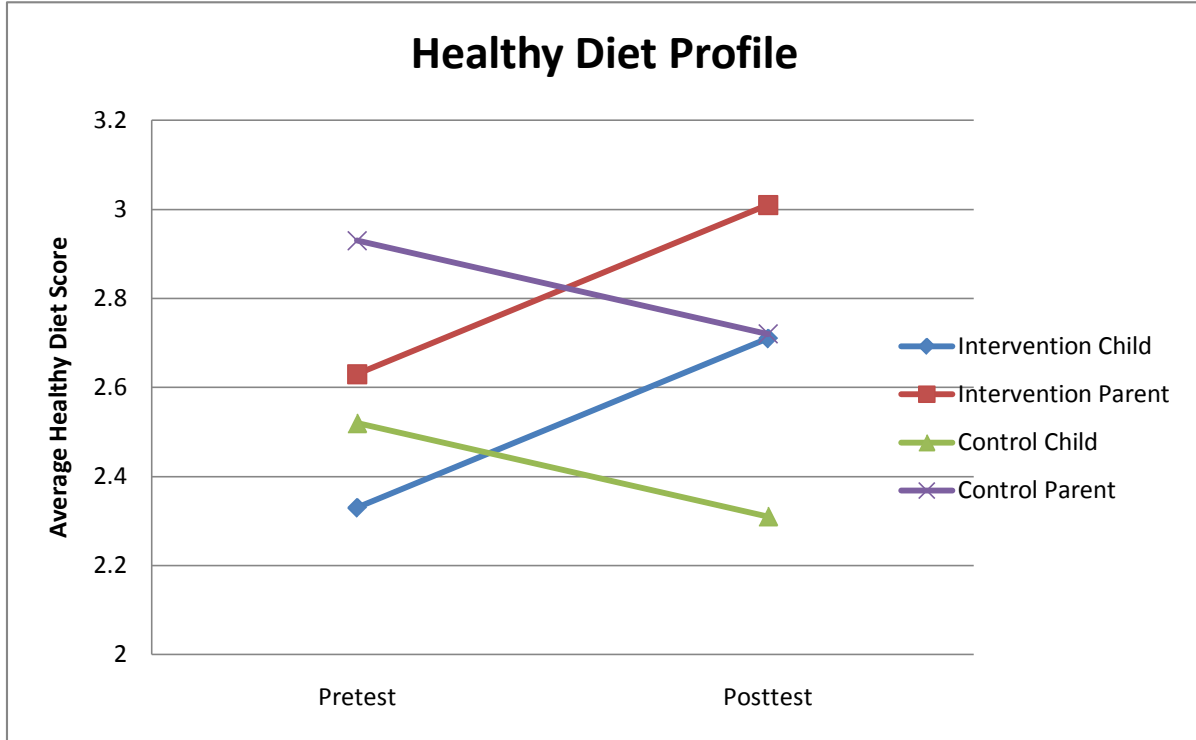


Figure 1. Healthy Diet Profile Pretest and Posttest. (Child-parent effect was observed at the intercept for both groups; however, the slope was consistent between parent and child in both groups)

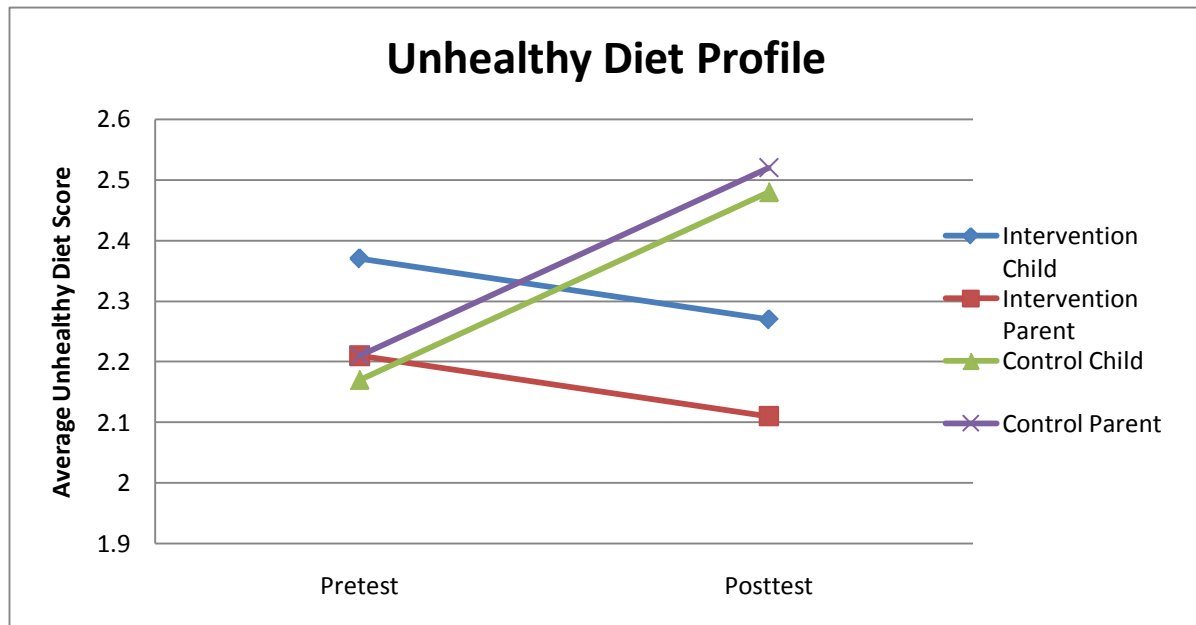


Figure 2. Unhealthy Diet Profile Pretest and Posttest. (Child-parent effect was observed at the intercept for both groups; however, the slope was consistent between parent and child in both groups).

Appendix A
Prospectus

Chapter 1

Introduction

Diets high in whole grains, fruits and vegetables are associated with lower risk of cardiovascular disease (CVD), cancer, and stroke (Bruce, Spiller, Klavey, & Gallagher, 2000; Steffen, Jacobs, Stevens, Shahar, Carithers, & Folsom, 2003). Also, diets rich in whole foods are correlated with reduced rates of a multitude of different diseases not directly linked to mortality such as diabetes and obesity (Adams & Standridge, 2006).

Although eating whole grains, fruits, and vegetables provide powerful protective properties against a variety of diseases, sufficient intakes of such foods is lacking in the majority of Americans who only eat a fraction of what they should in recommended whole grains, fruits and vegetables (Cleveland, Moshfegh, Albertson, & Goldman, 2000; Ellis, Johnson, Fischer, & Hargrove, 2005). Conversely, health-wrecking fats and sugars contribute most of the calories in the average diet (Bachman, Reedy, Subar, & Krebs-Smith, 2008).

With rising rates of disease and obesity associated with the consumption of the wrong types of calories, many strategies targeting improved nutrition have been implemented. Individual nutrition plans, while temporarily successful during the intervention, have not seemed to have an impact on national obesity and disease statistics (Beresford, Thompson, Feng, Christianson, McLerran, & Patrick, 2001; Howerton, Bell, Dodd, Berrigan, Stolzenburg-Soloman, & Nebeling, 2007; Te Velde, Brung, Winf, Hildonen, Bjelland, Perez-Rodrigo et al., 2008). Lack of success in improving nutrition may be attributed to home availability of healthy food choices and family social support (Jago, Baranowski, & Baranoski, 2007; Larson, Neumark-Sztainer, Hannan, & Story, 2007). Furthermore, parental modeling has been shown to effectively change children's intake of fruits and vegetables (Pearson, Biddle, & Gorely, 2008). This evidence suggests that families, instead of individuals, should be the focus in attempting to

change dietary habits. Religious organizations have been used as a mode of changing dietary behavior because of their emphasis on the family and ability to reach people on a less superficial level.

Utilizing churches to promote health is not a novel concept. For example, Black church settings have been used to increase cancer screening and awareness (Matthews, Berrios, Darnell, & Calhoun, 2006), promote increased vehicle seat-belt usage (Falcone, Brently, Ricketts, Allen, & Garcia, 2006), and reduce drug dependence (Stahler, Kirby, & Kerwin, 2007) among their members. Black churches have also been studied for improving nutrition and physical activity habits (Resnicow, Campbell, Carr, McCarty, Dudley, & Baronowski, 2004; Resnicow, Jackson, Wang, De, McCarty, & Baronowski, 2001). Additionally, Seventh-day Adventist churches (Singh, Linstead, & Fraser, 1999; Singh, Sabate, & Fraser, 2003) and the Church of Jesus Christ of Latter-day Saints (LDS) (Merrill & Lyon, 2005; Merrill, Hilton, & Daniels, 2003) have also been studied because of their unique doctrinal beliefs regarding nutrition and the health benefits members have reaped because of their lifestyles.

Although abstaining from alcohol, tobacco, and tea as outlined in the LDS church's Word of Wisdom have been beneficial to LDS health in general (Merrill & Lyon, 2005; Merrill et al., 2003), LDS members in Utah are becoming increasingly susceptible to obesity (Merrill & Hillam, 2006) and its associated diseases due to poor nutrition choices and less exercise (Merrill & Thygeson, 2001) when compared to members of other religious affiliations in Utah.

Due to the common practice of Family Home Evening (FHE) in the LDS culture, it may be possible to reach large numbers of families for the purpose of teaching and establishing healthy behaviors. Family Home Evening is a regular night of family instruction for the purpose of uniting and strengthening families. Family Home Evening presents the opportunity to learn

about spiritual and secular matters as a family. In fact, according to LDS leadership, the home should be the center of teaching and instruction (First Presidency Statement, 2008). Latter-day Saint families could possibly use this designated time to learn about the health of their bodies through diet and nutrition principles.

This study is designed to test the feasibility of using a pre-established religious program, FHE, as a way of teaching and modifying dietary behaviors in the LDS population. By teaching families as a whole about healthy nutrition habits using valid nutrition information based on the most current nutrition research, we hope to improve dietary knowledge and subsequently nutrition behavior. If this method is effective in teaching and changing dietary behavior in a LDS sample, the information might be implemented on a wider scale to help LDS families change their dietary lifestyles for the purpose of improving health and reducing risk of disease.

Statement of Purpose

The purpose of this study is to assess the effectiveness of FHE lessons used as a tool to increase nutritional learning and improve dietary behavior in LDS families.

Research Hypothesis

FHE lessons on nutrition will lead to improved dietary behaviors in the LDS sample of the population studied.

Null Hypothesis

FHE lessons on nutrition will have no effect on dietary behaviors in the LDS sample of the population studied.

Definition of Terms

Family - Two parents with a least two children 6-16 years of age

Harvard Healthy Eating Pyramid – Guidelines on nutrition selected by analyzing the most current research

Nutrition - Current guidelines as outlined in MyPyramid.gov and Harvard Healthy Eating Pyramid

Delimitations

1. The participants will be volunteers
2. FHE lessons will not be supervised by researchers
3. Families must include both parents and have at least two children aged 6-16
4. Families must have home access to the internet
5. Families must commit to hold six consecutive weekly FHE lessons

Assumption

We assume that FHE lessons on nutrition will improve the family's knowledge about nutrition and subsequently, their dietary behavior.

Limitations

1. Families have to be responsible for their own learning
2. Study results are not highly generalizable

Chapter 2

Review of Literature

Nutrition and Disease

Diets high in whole grains, fruits and vegetables are associated with lower risk of cardiovascular disease (CVD), cancer, and stroke (Bruce et al., 2000; Steffen et al, 2003). Also, diets rich in whole foods are correlated with reduced rates of a multitude of different diseases also linked to mortality such as diabetes and obesity (Adams & Standridge, 2006).

Numerous studies have been conducted to investigate the nutrition and disease link. The Atherosclerosis Risk in Communities (ARIC) cohort specifically studied the relationship of whole-grain, refined-grain, and fruit and vegetable intakes with the risk of total mortality and the incidence of coronary artery disease (CAD) and ischemic stroke. The cohort was followed over 11 years, and it was found that whole-grain intakes were inversely associated with total mortality and incident CAD. The subjects in the quintile with a mean intake of three servings of whole grains per day had a 23% and 28% lower risk of total mortality and incident CAD, respectively, than did those in the quintile with a mean intake of 0.1 serving per day. Those who had a mean intake of 7.5 servings of fruits and vegetables had a 22% lower risk of total mortality than those in the 1.5 servings of fruits and vegetables group. This study showed an inverse association between fruit and vegetable intake and CAD among African Americans but not among whites (Steffen et al., 2003). Eating a diet rich in fruits, vegetables, and whole grains protects against premature death and CAD.

In an elderly population, a prospective cohort study was conducted to determine if fiber consumption from fruit, vegetable, and cereal sources was associated with incident CVD. The cohort of 3,588 people was followed for 8.6 years. During this time, there were 811 events

related to CVD. After adjusting cereal fiber for several confounding factors, those in the quintile who consumed the most cereal fiber had 21% lower risk of incident CVD than those in the lowest quintile. In similar analyses, neither fruit fiber intake nor vegetable fiber intake were associated with incident CVD. When CVD events were separately evaluated, higher cereal fiber intake was associated with lower risk of total stroke and ischemic stroke and a trend toward lower risk of ischemic heart disease death. The source of cereal fiber also seemed to matter. Dark breads such as wheat, rye, or pumpernickel were associated with a lower risk of incident CVD compared to cereal fiber from other sources (Mozaffarian, Kumanvika, Lemaitre, Olson, Burke & Siscovick, 2003).

In addition to CVD, low fruit, vegetable and whole grain consumption is also associated with reduced cancer risk. Kirsh, Peters, Mayne, Subar, Chatterjee, Johnson, et al. (2007) evaluated the association between prostate cancer risk and intake of fruits and vegetables in 1,338 patients with prostate cancer in the screening arm of the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial. Participants completed both a general risk factor and a 137 item food frequency questionnaire at baseline. Vegetable and fruit consumption was not related to prostate cancer risk overall; however, risk of extraprostatic prostate cancer (stage III or IV tumors) decreased with increasing vegetable intake. This association was mainly explained by intake of cruciferous vegetables, in particular broccoli and cauliflower. (Kirsh et al., 2007).

In another study, gastric cancer risk was analyzed in a large Swedish cohort. Participants of the study completed a food frequency questionnaire in 1997 and were followed up for cancer incidence through 2005 (Larsson, Bergkvist, & Wolk, 2006). During the follow-up period, 139 incident cases of gastric cancer were identified. Vegetable consumption was inversely associated with risk of gastric cancer, but no significant association was observed for fruit

consumption. After controlling for age and other risk factors, women and men who consumed greater or equal to 2.5 servings a day of vegetables were half as likely to develop gastric cancer compared with those who consumed less than one serving a day. Among specific subgroups of vegetables, consumption of green leafy vegetables and root vegetables proved to be especially protective against gastric cancer (Larsson et al., 2006).

Colorectal cancer has also been strongly linked to diet. In a study by Flood, Rasgoti, Wirfalt, Mitrou, Reedy, and Kipnis et al. (2008), three primary dietary patterns were analyzed: a fruit and vegetables pattern, a diet foods pattern, and a red meat and potatoes pattern. Men with high scores on the fruit and vegetable pattern were at decreased risk (.81 as likely). High scores on the red meat factor were associated with increased risk: men were 17% more likely and women were 48% more likely to develop colorectal cancer. These results emphasize the importance of limiting meat and potato consumption and increasing consumption of fruits, vegetables and fat-reduced foods to decrease risk of colorectal cancer (Flood et al., 2008).

Poor nutrition has also contributed significantly to the current rise in obesity among adults and children. Data for adults suggest that overweight prevalence has increased by more than 50% in the last 10 years (Strauss & Pollack, 2001). Data for children also suggest that the prevalence of overweight continues to increase rapidly. By 1998, overweight prevalence in children increased to 21.5% among African Americans, 21.8% among Hispanics, and 12.3% among non-Hispanic whites. In addition, overweight children were heavier in 1998 compared with 1986 (Strauss & Pollack, 2001).

Roblin (2007) found that the numbers of overweight and obese children have doubled and tripled, respectively, over the past 3 decades. Poor eating habits, including inadequate intake of vegetables, fruit, and milk, and eating too many high-calorie snacks, play a role in childhood

obesity. The rates of childhood obesity are especially troubling because overweight and obese children typically become overweight and obese adults (Irwin, Bouck, Tucker, & Pollett, 2005).

Obesity in adulthood is associated with a myriad of health problems.

Current Intakes of Whole Foods

Although eating whole grains, fruits and vegetables provide powerful protective properties against a variety of diseases, sufficient intakes of these foods is lacking. Bachman et al. (2008) identified the major sources of food group intakes in the US population using data from the National Health and Nutrition Examination Survey (NHANES) 2001-2002. The reported food group intakes were compared to recommended guidelines set forth by the United States Department of Drug and Agriculture (USDA) in their online database, MyPyramid.gov. In regard to proportion, dark green vegetables, orange vegetables, and legumes fell short of recommended levels with only about 5% of calories coming from each category. Intake of whole grains, only 10% of total calories, was far below the recommendation that at least half of all grains be whole. Most of our oil was found in potato chips, and sweetened carbonated beverages provided 37% of added sugars (Bachman et al., 2008).

Adults are not the only ones consuming less than the recommended levels of fruits, vegetables, and whole grains. Ball, Benjamin, and Ward (2008) conducted a dietary observation of 117 children aged two to five years old from 20 childcare centers throughout North Carolina. In the childcare centers, the children consumed only 13% of MyPyramid.gov recommendations for whole grains and 7% of MyPyramid.gov recommendations for dark vegetables. Also noteworthy, 50% of milk consumed was whole milk, and 75% of the meat consumed was of the high-fat or fried variety (Ball et al., 2008). These calculations were adjusted according to the time spent at the center to account for food consumption at home.

Another study looking at children's diets found that grain products provide the highest percentage (31%) of daily calories, followed by "other foods," which have limited nutritional value (22% of daily calories). Snacks account for 27% of total daily calories, which is more than the calories consumed at breakfast (18%) and lunch (24%), but not dinner (31%). For children older than 4 years of age, more than 41% of daily snack calories come from other foods, such as chips, chocolate bars, soft drinks, fruit drinks, sugars, syrup, preserves, fats, and oils (Roblin, 2007).

In a study isolating the use of whole grains, the average number of servings of grain for the American population was 6.7 grams a day (Cleveland et al. , 2000). Of these servings, only one gram of grain was typically consumed in its unrefined state (Cleveland et al., 2000; Ellis et al., 2005). The dietary guidelines issued by the USDA dictate that half of our daily grains should be whole grains (USDA, 2005). This would equate to eating three to four grams of unrefined grains a day according to Cleveland's average consumer of calories. While this moderate increase in whole grain consumption would lead to better health, current research suggests a dose-response relationship between whole grains and health. In order for whole foods to have its greatest impact on optimal health and protection against disease, most grains consumed should be whole (Harvard Healthy Eating Pyramid, 2006).

Another study was conducted within a family setting to investigate rates of fruit and vegetable consumption. While data on all family members was collected, children were specifically targeted. At the age of 7 months, children were randomized to the intervention or the control group and were tracked until the age of 11 years. While the intervention only showed slight improvements on the consumption of the boys' fruit and vegetable intakes during the 10 years, the data showed that all children had significantly below the recommended amounts of

fruits and vegetables, and the percentage of total energy intake provided by fruits and vegetables decreased as the children grew older. It also showed that a mother's consumption correlated with the consumption of their daughters and sons, whereas a father's consumption correlated only with the consumption of their sons (Talvia Rasanen, Lagstrom, Pahkala, Viikari, & Ronnema et al., 2006). In addition to fruit and vegetable intakes, this study shows that parents have a large influence on what their children eat and suggests that a good way of increasing fruit and vegetable intake would be to target the family.

This evidence suggests that fruits, vegetables, and whole grains are not being consumed at the minimal recommended levels throughout the United States. Instead of eating disease protecting whole foods, the bulk of the typical American's calories come from non-nutritive sweetened beverages, grain-based desserts, non-skim dairy products, and fatty meats (Bachman et al., 2008). How can we change these health-wrecking trends?

Improving Nutrition

Environmental factors are critical to health behavior change. Dietary change is especially susceptible to outside influence. We typically eat what others around us eat and what we have been taught to prepare and enjoy. The environment for increasing whole grains, fruits and vegetables can include social elements as well as other elements such as knowledgeable advice and encouragement.

Schools have been one environment used to help children learn about nutrition and improve their nutrition; however, these efforts have only been moderately successful. In one meta-analysis, data from seven school intervention studies were pooled together and examined. The 8,156 primarily elementary aged children were matched from pretest to posttest to see the net fruit and vegetable (FV) difference and the net FV relative change in the children's FV

servings. At the individual level, the net difference in FV consumption was only 0.45 servings; the net relative change was a modest 19% increase in servings (Howerton et al., 2007).

Another study looked at the long term effects of a school FV intervention implemented throughout Europe (Te Velde et al., 2008). The objective of the study was to evaluate the effects of the Pro Children intervention on 10- to 11-year-old school children's FV intake after one and two years of follow-up. The intervention combined a FV curriculum with efforts to improve FV availability at schools and at home. Immediately after the intervention, the adjusted FV intake reported by the children from intervention schools was 20 % higher than FV intake reported by children from control schools. At one year later, a significant impact was only observed in Norway, where the program was better implemented. As shown in Norway, carefully implemented interventions might result in longer-term effects; however, getting schools and students on board has proved to be difficult (Te Velde et al., 2008).

The work place has also been a common mode of intervention. One effective study, the Seattle 5-a-Day Intervention, had worksite investigators design and evaluate an intervention. The investigators recruited 28 worksites with cafeterias and randomized 14 to intervention and 14 to control. The intervention addressed both changes in the work environment and individual level behavior change. In each worksite, an employee advisory board, with study interventionist assistance, implemented the program. By surveying cross-sectional samples of 125 employees per worksite, they compared worksite mean FV consumption at two-year follow-up with their baseline data. The difference at two years was 0.5 for the intervention worksites and 0.2 for the control worksites, with an intervention effect of 0.3 daily serving increase (Beresford et al., 2001).

While strategies targeting individuals have seen moderate success, half a serving increase of FV is not going to drastically affect obesity and disease rates. Two thirds of the food we eat is typically in the home; the home should be the place we target our efforts.

One way to increase whole food intake is to change the home environment. Creating a setting with ample availability to healthy foods has been proven to increase the amount that fruits, vegetables, and whole grains are consumed. A review of several qualitative studies conducted among children and adults indicated that greater availability was associated with greater consumption (Jago et al., 2007). Availability was associated with dietary variables such as preferences in cross-sectional studies. Intervention studies attempting to increase availability have resulted in increased consumption, and availability has predicted change in consumption over an 18-month period (Jago et al., 2007).

In order to facilitate a home environment packed full of fruits and vegetables, social support from family members must be in place. If low support is perceived, these types of foods will not be purchased, and the cycle of eating poorly will continue (Baranowski, Watson, Missaghian, Broadfoot, Cullen & Nicklas et al., 2008). In one study, about 100 participants were recruited in front of grocery stores and contacted twice for telephone interviews. It was found that social support was the primary predictor of home fruit availability. In home vegetable availability, social support, body mass index (BMI), and shopping practices were the primary predictors (Baranowski et al, 2008).

Availability of healthy foods is a start to eating more fruits, vegetables and whole grains; however, there is more to getting a family to eat their fruits and vegetables than just stocking the fridge full and expecting them to magically disappear. Befort, Kaur, Nollen, Sullivan, Nazir and Choi et al. (2006) looked at FV home availability and the effects of eating meals as a family,

while watching television, and at three types of restaurants. The researchers surveyed 220 adolescents and their parents in an urban adolescent health clinic. Home availability was not significantly associated with fruit, vegetable, or fat intake except for fruit intake among white adolescents only. Use of non-fast-food restaurants was the strongest positive predictor of vegetable intake. For all adolescents, fast-food and buffet restaurant use and eating while watching television were the strongest predictors of fat intake. The researchers concluded that “intervention programs on adolescent nutrition should target not just availability of healthy foods, but also ease of access, such as the preparation of fruits and vegetables so that they are flavorful and ready to eat” (Befort et al, 2006, p. 367).

In addition to availability and preparation, parental modeling is also a vital part of children consuming adequate fruits, vegetables, and whole grains. Pearson et al. (2008) reviewed the literature to find associations between the family environment and adolescents’ FV consumption. After reviewing 60 papers, they consistently found that parental modeling and parental intake were positively associated with children's fruit, juice, and vegetable (FJV) consumption. There were also positive associations between home availability, family rules and parental encouragement and children's fruit and vegetable consumption. Most importantly, if the parents had high FJV consumption, the adolescents were more likely to have high FJV consumption (Pearson et al., 2008).

Another study showed yet again the importance and effectiveness of doing nutritional interventions through the family unit. Boutelle, Birkeland, Hannan, Story, and Neumark-Stainer (2007) looked at the effect mothers’ perceived and actual attitudes about healthy eating had on their children and the home food environment. Seven hundred and fourteen mothers of teens who participated in the Project Eating Among Teens (EAT) were contacted by telephone. Mothers

responded to a question regarding how much they were personally concerned with eating healthy, and adolescents responded to a question regarding perceptions of their mothers' concern about eating healthy. A positive association was found between maternal concern for healthy eating and maternal FV intake, maternal breakfast and lunch consumption, and serving FV in the home. "Maternal concern for healthful eating (as reported by mothers) was not associated with adolescent behavior; however, adolescent perception of maternal concern for healthful eating was positively associated with adolescent fruit and vegetable intake" (Boutelle et al., 2007, p. 248).

Eating meals together is another effective way to improve nutrition through family intervention. In one study, Neumark-Sztainer, Hannan, Story, Croll, & Perry (2003) examined family meal patterns and the associations with dietary intake in adolescents. The 4,746 participants completed the Project EAT survey and the Youth and Adolescent Food Frequency Questionnaire within their schools. The researchers found there to be a wide distribution in the frequency of family meals during the previous week, with the highest percentage (40%) only having family meals three to six times a week. Children who reported having more frequent family meals had higher intakes of fruits, vegetables, grains, and calcium-rich foods. Family meals were also negatively associated with soft drink consumption (Neumark-Sztainer et al., 2003).

In addition, the benefits of regular family meals may help children carry these principles of nutrition into young adulthood (Larson, Neumark-Sztainer, Hannan, & Story, 2007). In a 5-year longitudinal study in Minnesota, surveys and food frequency questionnaires were completed by 946 female students and 764 male students in high school classrooms in 1998 and by mail in 2003. Family meal frequency during adolescence predicted higher intakes of fruits, vegetables,

dark-green and orange vegetables, and key nutrients and lower intakes of soft drinks during young adulthood. Frequency of family meals during childhood also predicted more breakfast meals in females and for both sexes predicted more frequent dinner meals, higher priority for meal structure, and higher priority for social eating (Larson et al., 2007).

In order to successfully change dietary behavior, the entire family's eating behavior needs to be targeted. Finding a way to reach all the members in a family is a daunting task for health promoters unless the family can be reached through an effective conduit. Religious organizations just might be that conduit. Churches and other places of worship can be especially effective in dietary intervention because the majority operate through family units and place their emphasis on the family.

Intervention through Religious Organizations

Using churches to promote health is not a novel concept. For example, Black church settings have been used to increase cancer screening and awareness (Matthews et al., 2006), promote increased vehicle seat-belt usage (Falcone et al., 2006), and reduce drug dependence (Stahler et al., 2007) among their members. Black churches have also been used to improve dietary behaviors.

One study, Body and Soul, was constructed from two successful research-based interventions conducted in Black churches to increase FV intake. At the 6-month follow-up testing, the intervention participants showed significantly greater FV intake relative to the control group. The actual differences between the groups were 0.7 and 1.4 servings for the 2-item and 17-item FV frequency measures, respectively. This study also showed statistically significant changes in fat intake, motivation to eat FV, social support, and efficacy to eat FV (Resnicow et al., 2004).

Resnicow et al. (2001) also performed an earlier study, Eat for Life, using motivational interviewing in Black churches to increase FV intake. Fourteen churches were randomly assigned to three treatment conditions: comparison, self-help intervention with one telephone cue call, and self-help with one cue call and three counseling calls. Resnicow et al. found that FV intake was significantly greater in the motivational interviewing group than in the comparison and self-help groups. The net difference between the motivational interviewing and comparison groups was consistently about one serving more in the motivational group according to all three food frequency questionnaires (FFQ). They concluded that “motivational interviewing appears to be a promising strategy for modifying dietary behavior, and Black churches are an excellent setting to implement and evaluate health promotion programs (Resnicow et al., 2001, p. 1686).”

Campbell, Motsinger, Ingram, Jewell, Makarushka, and Beatty et al. (2000) designed the North Carolina Black Churches United for Better Health project to be a four-year intervention with the purpose of increasing FV consumption among rural African-American adults. They used participant surveys, church reports, and qualitative interviews to assess the intervention’s effectiveness. According to the surveys and interviews, serving more FV at church functions was the most frequently reported activity and had the highest perceived impact, followed by the personalized tailored bulletins, pastor sermons, and printed materials. Also, the intervention group consumed 0.85 servings more than the delayed intervention group at the 2-year follow-up (Campbell et al., 2000).

These previous studies were conducted by a group outside the church teaching and promoting dietary principles. The Adventist Health Studies show us the power of preaching health practices as part of the integrated doctrine of the church. Seventh-day Adventists use the

acronym CELEBRATIONS to remind their members of its basic health beliefs. Of particular note are “E” for exercise, “T” for temperance and “N” for nutrition (Health 20-20, 2008):

EXERCISE

1. In God we live, move, and have our being (Acts 17:28).
 - This week, I will exercise daily by walking (running, cycling ...) with the Lord as I pray for my neighbors when passing their homes.

TEMPERANCE

1. In I Corinthians 9:25, we are encouraged to be temperate in all things.
 - By God's grace, I will seek to avoid harmful foods, beverages, and activities, and to practice moderation in my work, phone use, television viewing, spending ...

NUTRITION

1. In the first chapter of Daniel, we are told that he and his three friends requested a simple vegetarian diet. As a result, they were significantly wiser than the king's regular counselors.
 - I will seek to eat more healthfully, so I can better bring "glory to God" (see I Corinthians 10:31).

By intertwining science and religion into adaptable principles, Adventists have realized major health benefits and provided researchers with ideal study participants in the Adventist Health Studies.

In a prospective cohort study of Seventh-day Adventists, Vang, Singh, Lee, Haddad, & Brinegar (2008) examined the relation between diet and incident diabetes. They found that subjects who were weekly consumers of all meats were 29% more likely to develop diabetes than those who consumed no meat. Also, those who consumed any processed meats were 38%

more likely to develop diabetes. This relationship proved to be strengthened with time; those who lived a vegetarian life the longest were protected most from diabetes. It is also noteworthy that even after controlling for weight and weight change, weekly meat intake remained an important risk factor for diabetes (Vang et al., 2008).

Singh et al. (2003) examined whether less than weekly meat intake contributes to greater longevity. They reviewed data from six prospective cohort studies and analyzed the life expectancy of long-term vegetarians. Their review found that a very low meat intake was associated with a significant decrease in risk of death in four of the six studies. They also found that the longer the subject adhered to the vegetarian diet, the greater the benefits of lower mortality and increased life expectancy (Singh et al., 2003).

In a 12-year prospective study, Singh et al. (1999) examined the relation between BMI and mortality among cohort members of the Adventist Health Study who had never smoked cigarettes and had no history of coronary heart disease, cancer, or stroke. The authors found a direct positive relation between BMI and all-cause mortality among middle-aged men, older men, middle-aged women, and older women who had undergone postmenopausal hormone replacement. Among older women who had not undergone postmenopausal hormone replacement, the authors found a J-shaped relation in which BMI less than 20.7 kg/m² was associated with a twofold increase in mortality risk that was primarily due to cardiovascular and respiratory disease. These findings not only identify adiposity as a risk factor among adults, but also raise the possibility that very lean older women can experience an increased mortality risk that may be due to their lower levels of adipose tissue-derived estrogen (Singh et al., 1999).

Willet (2003) briefly summarized what we have learned from the Adventists as of 2003:

Comparisons of diets and disease rates between Adventists and non-Adventists, and prospective cohort studies among Adventists, have contributed greatly to our general understanding of nutrition and health. The most fundamental conclusion drawn from the Adventist Health Studies has been that maintaining a lean body weight throughout life is central for optimal health. Other contributions have included the value of nut consumption for prevention of coronary artery disease, and the roles of red meat and dairy products in the etiologies of cardiovascular disease and cancer (Willet, 2003, p. 539S).

The Seventh-day Adventists are not alone in their belief that the body is a temple and should be treated with utmost respect and care. The LDS church also upholds a dietary policy called the Word of Wisdom (Doctrine and Covenants 89). Doctrine of the LDS church states that strong drinks, tobacco, and hot drinks are not for the belly. Herbs and fruits in season are to be used “with prudence and thanksgiving (p. 176).” Meat is to be used sparingly, and “all grain is ordained for the use of man and of the beasts, to be the staff of life (p. 176).” If members obey this Word of Wisdom, they will be blessed with “marrow in the bones and health in the navel [...] and they shall run and not be weary, and walk and not faint (p. 176)” (Doctrine and Covenants 89: 7-9, 11-14, 18, 20).

Indeed the Word of Wisdom has protected the LDS population from many of the diseases common in the United States. During 1995 to 1999, significantly lower cancer incidence rates were observed among the LDS population compared with a non-LDS population in Utah. The lower rates were primarily explained by smoking-related cancers and female breast cancer. If the overall cancer incidence rate in LDS had occurred in the non-LDS population, 421 fewer cases

would have occurred among males and 1,025 fewer cases would have occurred among females during the study period (Merrill & Lyon, 2005).

Another study by Merrill et al. (2003) assessed the impact the LDS church's health doctrine has on deaths and years of potential life lost (YPLL) from diseases and conditions associated with cigarette smoking in Utah. They found that if smoking-attributed death and YPLL rates for non-LDS matched those of the LDS between 1994 and 1998, there would be 1,135 fewer deaths for men and 899 fewer deaths for women, and 13,973 fewer years of life lost for men and 10,124 fewer YPLL for women (Merrill et al, 2003).

Merrill and Thygeson (2001) evaluated the relationship between religious preference, church attendance, and physical activity. They found that within religious groups, those attending church weekly were more likely to exercise than individuals attending church less than weekly and that LDS members attending church less than weekly were the least physically active in Utah. They also found that outside of the LDS religion, those who faithfully attended other churches were significantly more physically active than LDS members (Merrill & Thygeson, 2001).

Although abstaining from alcohol and tobacco have been beneficial to LDS health in general, members of the LDS church in Utah are becoming increasingly susceptible to obesity (Merrill & Hillam, 2006) and its associated diseases due to poor nutrition choices and less exercise (Merrill & Thygeson, 2001) when compared to church-goers of other faiths in Utah.

Members of the LDS church understand the “don’ts” of the Word of Wisdom—no smoking or drinking alcohol, coffee, and tea—but they seem to have disregarded the specific “do’s.” Stronger emphasis on the do’s of the Word of Wisdom should help to curtail the rising obesity rates in the Utah LDS population. Teaching nutrition over the pulpit may not be seen as

appropriate in some congregations; however, several other resources besides the pulpit exist that could be great tools for health promotion. These resources include magazine publications, fireside seminars, and family-based, once-a-week lessons of instruction called Family Home Evening (FHE).

Leaders of the LDS church have specifically taught about FHE:

We advise and urge the inauguration of a 'Home Evening' throughout the church, at which time fathers and mothers may gather their boys and girls about them in the home and teach them the word of the Lord. . . . 'Home Evening' should be devoted to prayer, singing hymns, songs, instrumental music, scripture-reading, family topics and specific instruction on the principles of the gospel, and on the ethical problems of life, as well as the duties and obligations of children to parents, the home, the Church, society and the nation. For the smaller children appropriate recitations, songs, stories and games may be introduced. Light refreshments of such a nature as may be largely prepared in the home might be served.

Family home evening is for everyone. It is for families with parents and children, for families with just one parent, and for parents who have no children at home. It is for home evening groups of single adults and for those who live alone or with roommates. . . .Regular participation in family home evening will develop increased personal worth, family unity, love for our fellow men, and trust in our Father in Heaven.

Family home evenings should be scheduled once a week as a time for discussions of gospel principles, recreation, work projects, skits, songs around the piano, games, special refreshments, and family prayers. Like iron links in a chain, this practice will bind a family together, in love, pride, tradition, strength, and loyalty.

Monday nights are reserved throughout the Church for family home evenings. We encourage members to set aside this time to strengthen family ties and teach the gospel in their homes. . . . Church buildings and facilities should be closed on Monday evenings. No ward or stake activities should be planned, and other interruptions to family home evenings should be avoided (First Presidency Statements, 2008).

Because members of the LDS church are already holding this night of instruction, giving them material on nutrition to study together should be effective in teaching them the often overlooked dietary principles of the Word of Wisdom. This should help increase their knowledge of principles of nutrition and change their dietary habits as well.

The Project

This study is designed to test the feasibility of using a pre-established religious program, FHE, as a way of teaching and modifying dietary behaviors in the LDS population. By teaching families as a whole about healthy nutrition habits using reliable nutrition information based on the most current nutrition research, we hope to improve dietary knowledge and subsequently nutrition behavior. If this method is effective in teaching and changing dietary behavior in an LDS sample, the information might be implemented on a wider scale to help LDS and potentially non-LDS families change their dietary lifestyles for the purpose of improving health and reducing risk of disease.

Chapter 3

Methods

Subjects

Participants for this study will be 80 LDS families residing in Central Utah. Families will be recruited by flyers, word of mouth, and referrals. For the purposes of this study, a family is defined as two parents with at least two children living at home between the ages of 6 and 16. To be enrolled in this study, the family must agree to pre-intervention testing, hold FHE once a week for six weeks to study the material provided, and complete post-intervention testing.

Permission to use families as part of this study will be obtained from the Brigham Young University IRB. In addition, consent/assent forms authorizing participation in this study will be signed by the families. Parental permission will be obtained for the participants younger than 18.

Study Design and Materials

The 80 families recruited to the study will be randomly divided between two groups: a nutrition intervention group and a control group. Before the study begins, the families will attend an orientation meeting with the researchers to become familiar with the study's purpose and format. All families in the nutrition intervention will be given six lessons to complete for FHE. During the six weeks of intervention, the nutrition group will cover topics specifically teaching nutrition principles, and the control group will complete assigned lessons on topics from the FHE manual published by the LDS church using their normal approach to FHE.

Before the families are given their FHE lessons, each family member will be required to complete an online food screener that assesses current nutrition habits (Block, G., Gillespie, C., Rosenbaum, E.H., & Jenson, C., 2000; Kolodinsky, J., Harvey-Berino, J., Berlin, L., Johnson, R., & Reynolds, T., 2007). Parents will assist younger children in completing the food screener

accurately. After taking the food screener, the 40 families assigned to the nutrition group will study the six prepared nutrition lessons together as a family during their regular FHE. All lesson material will be available online where they will go to print material and prepare teaching presentations. In the control group, the assigned families will study assigned lessons prepared from the FHE manual for their six weeks of FHE lessons. These lessons represent what the family would already be doing for FHE every week, but they will be assigned to prevent study contamination. The online site will also serve as a place to track attendance and compliance for both groups; after each lesson, all families will complete a brief survey asking about the quality of the FHE and list the family members who attended that week. An outline of the lessons is available in Appendix A. To keep the families interested in the FHE lessons, a weekly reminder email will be sent to each family prior to FHE with appropriate links to the lessons.

All FHEs will follow the layout of a song, prayer, lesson, activity, and healthy refreshment idea. The researchers will be available via telephone and email to help clarify any material that needs further explanation for the groups. If a family misses a lesson they will make it up the rest week. Intervention lessons will be consecutive and taught in order. Data will only be used for families who have completed at least four of six lessons. After the seven weeks of intervention, both groups will again complete the food screener. After the completion of study, the families will be given access to the nutrition-based family home evening lessons.

Analysis

This study will use a two group by two trials ANOVA to analyze differences between and within the nutrition group and control group with respect to nutrition behavior. The primary outcome to be analyzed is improvement in nutrition behavior by comparing the pre and post food

screeners. Lesson quality control will be analyzed by using the data from the weekly surveys.

Confounding factors such as age, gender, BMI, etc. will also be controlled.

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Appendix A-1
Lesson Outline

Lesson Outline

1. Caring for our mortal bodies
2. How does your nutrition stack up?
3. Focusing on the “do’s”
4. Heart healthy: Types of fat
5. Variety is key
6. Sticking with it

Appendix B
Food Screener

Please enter your first and last name. (this information will be kept confidential)

Please select your GENDER

Male

Female

USING NUMBERS ONLY enter your age (example: 35)

USING NUMBERS ONLY enter your height in inches (example: 68). Give your best estimate of your height if you do not know your exact height. Note: five feet = 60, five feet five inches = 65, five feet ten inches = 70, etc.)

USING NUMBERS ONLY enter your weight in pounds (example: 150). Give your best estimate if you do not know your exact weight.

For the following questions, think about your eating habits over the past 6 weeks. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Check one button for each food.

Fruits, Vegetables, and Grains

Fruit juice, like orange, apple, grape, fresh, frozen or canned. (Not sodas or other drinks)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

How often do you eat any fruit, fresh or canned (not counting juice?)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Vegetable juice, like tomato juice, V-8, carrot

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Green salad

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Potatoes, any kind, including baked, mashed or french fried

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Vegetable soup, or stew with vegetables

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Any other vegetables, including string beans, peas, corn, broccoli or any other kind

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Fiber cereals like Raisin Bran, Shredded Wheat or Fruit-n-Fiber

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Beans such as baked beans, pinto, kidney, or lentils (not green beans)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Dark bread such as whole wheat or rye

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

For the following questions, think about your eating habits over the past 6 weeks. About how often do you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Check one button for each food.

Protein and Fats

Hamburgers, ground beef, meat burritos, tacos

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Beef or pork, such as steaks, roasts, ribs, or in sandwiches

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Fried chicken

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Hot dogs, or Polish or Italian sausage

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Cold cuts, lunch meats, ham (not low-fat)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Bacon or breakfast sausage

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Salad dressings (not low-fat)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Margarine, butter or mayo on bread or potatoes

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Margarine, butter or oil in cooking

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Eggs (not Egg Beaters or just egg whites)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Pizza

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Cheese, cheese spread (not low-fat)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Whole milk

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

French fries, fried potatoes

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Corn chips, potato chips, popcorn, crackers

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Doughnuts, pastries, cake, cookies (not low-fat)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY

Ice cream (not sherbet or non-fat)

Less than 1/WEEK Once a WEEK 2-3 times a WEEK 4-6 times a WEEK Once a DAY 2+ times a DAY