

Findings from the Nutrition Challenge Program

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Introduction

Obesity is an epidemic in the United States. Over 61% of U.S. adults and 58% of Nevada adults have Body Mass Index's (BMI) that classify them as either overweight or obese (Behavioral Risk Factor Surveillance System [BRFSS], 2005). According to a recent article published in the Journal of the American Medical Association, obesity was the second leading cause of preventable death in the United States behind tobacco use (Mokdad, Marks, Stroup & Gerberding, 2004).

Obesity and overweight increase the risk for the top three killers in the United States: heart disease, cancer and cerebrovascular ailments including strokes. Obesity also strongly increases the risk of type II diabetes, the sixth leading cause of death in the country (U.S. National Center for Health Statistics, 2005.)

While obesity and overweight are complex, multi-factorial health conditions, an important contributor to the overweight and obesity epidemic is poor dietary habits. One of the major public health nutrition education efforts in the past few years has been to encourage Americans to eat more fruits and vegetables. Current dietary guidelines recommend consuming between 5 and 9 servings of fruits and vegetables each day depending on age and gender. A person's physical activity level and age determine how many calories they need each day and their calorie needs determine how many servings of fruits and vegetables they should eat each day. Only 23% of adults nationwide and 22% of Nevada adults are currently meeting that recommendation, most at the low end (BRFSS, 2005).

Fruit and vegetable consumption is an important factor in the overall obesity epidemic. Data demonstrates a negative relationship, or inverse association between fruit consumption and BMI, meaning people who eat more servings of fruit each day have lower body mass indices (Lin & Morrison, 2002). This same study found the relationship between vegetable consumption and BMI to be weaker than the fruit and BMI correlation, but there were some consistencies between vegetable

consumption and BMI in certain age and gender groups. For example, there was a negative relationship between vegetable consumption and BMI in boys. The study found that healthy-weight and at-risk-of-overweight boys consumed more servings of vegetables per day than did overweight boys. However, among men, there were no significant differences in the consumption of total vegetables among the three body-weight statuses (healthy, at-risk and obese). Researchers theorize that the weak relationship between vegetable consumption and body mass index might be explained by the way many Americans eat vegetables: deep fried, topped with high-fat dressings or included in high-fat entrees (Lin & Morrison, 2002).

Efforts to increase fruit and vegetable consumption by utilizing web-based nutrition education programs have been undertaken by a variety of organizations (Block, Block, Wakimoto, & Block, 2004). The use of the Internet to deliver health interventions is increasing rapidly and has been mentioned as an inexpensive way to increase outreach particularly to rural areas (Block et al., 2004). Therefore, the purpose of this study is to determine the effectiveness of the Nutrition Challenge program at increasing fruit and vegetable consumption and altering behavior change readiness among program participants.

Methods

In the spring of 2006, the Southern Nevada Health District, Office of Chronic Disease Prevention & Health Promotion, using funding received through a grant from the Nevada Trust Fund for Public Health, created the 'Nutrition Challenge' program. The Nutrition Challenge is a 12-week, web-based program that provides nutrition education specifically focusing on the importance of fruit and vegetable consumption. Participants were asked to log their daily servings of fruits and vegetables and could visually track their progress on a graph.

Each week participants were provided with new nutrition information as part of the program. During week one, participants received serving size guidelines and were sent a web link to the 5 a Day program for additional serving size information. In week two, participants received several fruit-based healthy dessert recipes that they could print and were also sent web links for additional recipes. Content for week three focused on why eating fruits and vegetables is important specifically the health benefits associated with fruit and vegetable consumption. These benefits include the vitamins and minerals in fruits and the reduction of risk factors for many chronic diseases that occupy fruit consumption.. Content for week four concentrated

on tips that participants could use to increase their daily fruit and vegetable servings. These tips included ways to incorporate fruits and vegetables into meals. During week five, participants received suggestions for increasing fruit and vegetable consumption while eating out. A web link to an online nutrition calculator that provides nutrition content of several popular fast food items was also provided during this week. Week six content provided simple and tasty fruit and vegetable-based recipes for salads and side dishes. Content for week seven focused on educating participants on reading food labels, including information about trans fat. Week eight materials focused on the importance of eating a variety of colorful fruits and vegetables. During week nine, program participants learned healthful eating tips for the entire family. Both Dietary Guidelines for Americans and My Pyramid resources were included as well as tips to eat foods with less salt, cholesterol and beverages with lower levels of sugar. Week ten content included fruit and vegetable-based heart-healthy recipes for entrees. During week eleven, tips for healthy snacking were provided. An online nutrition calculator was included as an interactive tool to learn healthy snack guidelines and get participants to read food labels on their snacks. Finally, week twelve content focused on healthy eating in the real world. Several tips were included to address all you can eat buffets, choices in vending machines, and strategies at work, home, and restaurants.

Participants

Participants were recruited through several communication efforts that included flyers, newspaper and radio ads. Flyers were included as paycheck stuffers to Southern Nevada Health District employees; e-mailed to various agencies, recreation centers, and small businesses; information about the program was posted on the Clark County School District's Hotline to reach teachers and school staff members, and flyers were also distributed at several community events. A one-week paid newspaper ad was placed in local newspapers. Additionally, a paid two-month radio campaign aired on a popular radio station encouraging participants to "Take the Nutrition Challenge".

To register for the program, each participant created a username and password. In addition, participants were asked to answer a brief series of questions. Questions included participant's current number of daily servings of fruits and vegetables and participants were asked to respond to statements designed to assess current stage of behavioral change consistent with the Transtheoretical Model (Prochaska & DiClemente, 1985). Stages of change included selections: Not thinking about eating

healthier; Thinking about eating healthier; Preparing to eat healthier; Eating healthy, but for less than 6 months; and Eating healthy, but for more than 6 months. The pre-program survey was estimated to take less than two minutes to complete.

At the completion of the 12-week program, participants were prompted to complete a post-program survey containing the same questions as the pre-program survey. Participants were also asked if the Nutrition Challenge was easy to use (yes/no), if they would recommend the Nutrition Challenge to friends and family (yes/no) and were asked to share any suggestions or comments about the program. Additionally, e-mails requesting that participants complete the post-program survey were sent to those who met eligibility criteria.

Participants who enrolled in the Nutrition Challenge program were sent nutrition bracelets or balance bands as an incentive. Balance bands are five-rubber bracelets that are moved from one wrist to the other throughout the day as the individual consumed servings of fruits and/or vegetables. The purpose of the bracelets was to serve as a visual reminder to aid participants in keeping track of the number of servings of fruits and vegetables they ate each day. Pictures of women's, men's and children's balance bands were posted on the Get Healthy website www.gethealthyclarkcounty.org.

The program was designed to provide participants new nutrition information at the end of each seven-day period following the participant's registration date, regardless of whether they participated in the program for a total of 12 weeks. Therefore, if a participant logged in during one week they would see the nutrition education content for that week, but if they didn't log in again for another week, they would automatically see the nutrition education content for the new week. Once registered, participants could go back and review the content from previous weeks, but they could not view materials that were scheduled to be delivered in subsequent weeks. Each week, new content was available on-line. Participants entered servings of fruits and vegetables and could print out a record of their servings at any time during the program. A serving size description was included on the serving entry page.

For the duration of the 12-week program, the program coordinator sent participants a weekly e-mail directly from the Nutrition Challenge program that encouraged participants to log in at least three times per week to be eligible for weekly prizes. Each week eleven prizes, including 5 a Day insulated lunch bags and gift cards to restaurants where healthy menu options were available and cookbooks were awarded

at random to eligible prize winners. Winners were notified by e-mail.

Results

One thousand forty one (n = 1041) people were eligible to be included in cohort One. Eligible participants in this cohort were those participants who had at least 12 weeks to complete the program based on their original registration date. Of the 1,041 eligible participants, 170 people completed the pre and post-program surveys, a 16.3% completion rate. The range of ages of participants of cohort one who submitted post-program surveys was 21 to 65 years of age with the average age being 42.67 years (SD = 11.17). Most of the sample were females (n = 156; 90.7%).

The average number of fruits and vegetables consumed per day during the pre intervention period was 2.78 (SD=1.51). During the post intervention participants averaged 4.25 (SD = 1.89) fruits and vegetables per day. The results of a paired t-test revealed significant differences (t = 23.99; p <.001).

The stages of change are reported in Table 1. Over 70% of participants were at stage 3, 4 or 5. At the conclusion of the study nearly 90% of participants were at stage 3 or above. A t-test revealed significant (t = 16.59; p<.001) pre-post differences.

Discussion

The most interesting finding of this study is that a web-based intervention can be effective at increasing the number of fruits and vegetables that people consume. Thus, this study provides preliminary evidence that an online program may help increase fruit and vegetable consumption. This is important because a majority of Nevada adults are not currently meeting the low end of the recommended five to nine daily servings of fruits and vegetables as suggested by the United States Department of Agriculture (1996). The web-based nutrition program is a low-cost, sustainable intervention that may improve daily fruit and vegetable consumption and advance people along the stages of behavior change continuum in their efforts to eat more fruits and vegetables.

In addition to statistically significant improvements in fruit and vegetable intake the stage of behavior changes from pre and post-program survey were also significant. However, because of the lack of a randomized design, and a 16.3% response rate, more definite conclusions must await further research that utilizes an experimental design. Still it appears that an inexpensive web-based program can produce healthy changes in fruit and vegetable consumption.

The 16.3% response rate to the post-test is a program limitation. The reasons for the low post-test

response rates are several. Many participants provided incorrect e-mail addresses or changed their email addresses after registering for the program. Also, some program participants registered their children in the program to receive free bracelets and did not submit surveys for child participants. Additionally, serving size input was also a limitation because fruit and vegetable servings were self-reported by participants.

Further, because the program is a 12-week program with on-going registration, this study only captured a portion of the participants that had participated at least 12-weeks. However, based on data collected as part of the post-program survey, the program appears to be an effective means of helping participants make healthier behavior choices and increase their fruit and vegetable consumption.

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