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Food Intake Patterns of Self-identified Vegetarians among the U.S. Population, 2007-2010

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Abstract

Vegetarians' food intake patterns vary in the extent that they exclude all or some animal products (e.g., meat, poultry, fish/seafood, eggs, and dairy). We examined the differences of consumption of selected USDA Food Patterns food groups, subgroups, and food components, total calorie intake, and the number of food items between self-identified vegetarians and non-vegetarians in the U.S. population aged 1 year and older. Weighted reliable food consumption data from day 1 of the National Health and Nutrition Examination Survey, 2007-2010 and the USDA Food Patterns Equivalents Database, 2007-2010 were analyzed in the U.S. population (n=15,453) using SAS 9.3. Only 3% of the self-identified vegetarians (total 2.1%; n=323) did not consume any animal products. Compared to non-vegetarians, vegetarians consumed significantly fewer calories (1862 kcal vs. 2058 kcal; $p < 0.05$) with the same number of food items (n=16) per day, and they consumed significantly less meat, poultry, solid fats and added sugars, and more soy, legumes, and whole grains than non-vegetarians. Both groups consumed about the same amounts of eggs, dairy, seafood, fruits, and vegetables. After energy adjustment, vegetarians consumed significantly more fruits, vegetables, whole grains, and total grains than non-vegetarians per 1000 kcal. Although a large proportion of self-identified vegetarians report consuming some type of animal products, such as meat, poultry and/or seafood, their dietary patterns contain more plant-based foods and whole grains with less solid fats and added sugars. Caution is needed in interpreting the term "vegetarian" from self-reports. Increasing fruit, vegetable, and whole grain consumption remains a targeted message for all populations.

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1. Introduction

Vegetarianism has become a popular and a potentially healthful eating practice for more than a decade in the United States¹. Generally, vegetarians are identified as individuals who do not consume any foods containing animal flesh product². There are different eating patterns among vegetarians: vegans are those who do not eat any animal products including meat, fish/seafood, poultry, eggs, and dairy, while others may include dairy (lacto-vegetarians), eggs (ovo-vegetarians), or both products (lacto-ovo-vegetarians) in their diets. The percent of individuals who are identified as following a vegetarian diet varies, based on the specific survey and the way in which a vegetarian diet is identified. Most recently, in a 2012 survey, about 4% of U.S. adults aged 18 years and older self-reported that they were vegetarians, including about 1% that were vegans³. A similar prevalence in vegetarian and vegan children aged 8-18 years old was reported in a 2014 survey⁴.

Other studies have reported that individuals who considered themselves vegetarians may also consume some animal products (e.g., fish, chicken or red meat) as part of their daily diet^{5,6}. These individuals could be considered to be “self-described” vegetarians, or “semi-vegetarians²”. For example, in a British Columbia cross-sectional survey, about 14 (16%) and 51 (57%) out of 90 self-identified vegetarian women aged 18 to 50 years reported occasional consumption of chicken or fish, respectively⁵. A 1994-1996 national study found that 2.5% of the U.S. population aged 6 years and older considered themselves vegetarians, but about 36% of these self-reported vegetarians reported consuming meat products on the surveyed consumption day⁶. A 1999-2004 population-based survey of the U.S. adults aged 19 years and older found that 6% of the participants did not report eating any meat, poultry or fish on the day of the survey⁷. Reported prevalence of a vegetarian eating pattern has varied in these studies, perhaps due to when the study was conducted, the specific population group, or the way in which a vegetarian eating pattern was defined and assessed.

Despite the consumption of animal flesh products reported by the self-identified vegetarians, the dietary pattern in general for vegetarians appears to indicate a more “healthful” dietary practice compared to non-vegetarians. In general, self-identified vegetarians consumed more total fruits, total vegetables, especially dark green and deep yellow vegetables, legumes, and less table fats than non-vegetarians; there were no differences in consumption of milk and cheese products compared to non-vegetarians⁶. Self-identified vegetarians also reported consuming plant protein sources at least weekly⁵.

Although the dietary patterns of vegetarians suggest healthful dietary practices, there has been inconsistent evidence on the use of such dietary practices for weight loss or weight management purposes, which focus on the reduction of energy intake⁸. While some studies reported that vegetarians’ dietary patterns had been suggested as an approach for weight reduction or weight management to improve health⁷⁻⁹, other studies found that there was no difference in total energy intake between vegetarians and non-vegetarians^{10, 11}. Energy reduction could be the result of a reduction of variety in the diet¹² — in other words; it could be associated with the number of food items consumed per day. To our knowledge, no study has examined the differences in the number of food items consumed per day and only limited research has explored the differences in food intake patterns among self-identified vegetarians and non-vegetarians, especially in a nationally representative sample of the U.S. population. Therefore, the main purpose of this study was to compare the types and quantities of food groups and subgroups, as well as the average total energy intake and the number of food items consumed per day, in the dietary patterns of self-identified vegetarian and non-vegetarians in the U.S. population during the years of 2007-2010.

2. Subjects and method

For this study, we examined food consumption data from the combined survey years of 2007-2008 and 2009-2010 National Health and Nutrition Examination Survey (NHANES). NHANES uses a stratified, multiple-stage of probability sampling method to collect health- and nutrition-related information from about 5,000 civilian, non-institutionalized United States populations per year. The Diet Behavior and Nutrition component of the NHANES survey includes a question (“Do you consider yourself to be a vegetarian”) asking participants (or their proxies) aged 1 year and older their self-perception of vegetarian dietary practices. Only the definitive answers from the participants as either “yes” (considered as the “self-identified vegetarian”) or “no” (considered as “self-identified non-vegetarian” or “non-vegetarian”) were included in the data analysis for this study. The consumption data of the

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