

Available online at www.sciencedirect.com

ScienceDirect

www.nrjournal.com

Smokers report lower intake of key nutrients than nonsmokers, yet both fall short of meeting recommended intakes

Susan K. Raatz^{a,b,*}, Lisa Jahns^a, LuAnn K Johnson^a, Angela Scheett^a, Alicia Carriquiry^c,
Andrine Lemieux^d, Motohiro Nakajima^d, Mustafa al'Absi^d

^a USDA, ARS, Grand Forks Human Nutrition Research Center, Grand Forks, ND

^b Department of Food Science and Nutrition, University of Minnesota, Saint Paul, MN

^c Department of Statistics, Iowa State University, Ames, IA

^d Department of Biobehavioral Health and Population Sciences, University of Minnesota Medical School, Duluth, MN

ARTICLE INFO

Article history:

Received 5 January 2017

Revised 21 July 2017

Accepted 25 July 2017

Keywords:

Smoking

Nonsmoking

Dietary intake

Diet records

Nutrient intake

ABSTRACT

Smoking is a major risk factor in the development of preventable disease which may be due to a poorer diet and the reduced nutrient intake of smokers. Our objective was to compare and evaluate the reported intake of current smokers with that of nonsmokers among participants of a study evaluating stress and smoking. We hypothesized (1) that overall energy and nutrient intake would be reduced in smokers compared with nonsmokers and (2) that smokers would have increased noncompliance with Dietary Reference Intakes (DRIs). Men and women (smokers $n = 138$, nonsmokers $n = 46$) completed a 3-day diet record at baseline. Mean energy and nutrient intakes were stratified by smoking status and compared with DRI levels. The mean body mass index was $28.3 \pm 0.5 \text{ kg/m}^2$ for smokers and $27.2 \pm 1.0 \text{ kg/m}^2$ for nonsmokers. Compared with nonsmokers, the smokers reported lower intakes of energy, total polyunsaturated fatty acids, linolenic acid, docosahexaenoic acid, total sugars, calcium, iron, magnesium, phosphorus, potassium, vitamin C, riboflavin, niacin, pantothenic acid, vitamin B6, folate, vitamin A, and vitamin E. Smokers reported reduced compliance with the DRIs for iron, phosphorus, vitamin C, riboflavin, and folate compared with nonsmokers. Unlike other evaluations of smokers vs nonsmokers, we observed no difference in body weight between groups. Smokers and nonsmokers alike reported dietary intakes lower than the DRIs for many nutrients. However, the reported nutrient intake of the smokers was substantially lower than nonsmokers for key nutrients, and they were more likely to not comply with the DRIs for essential nutrients, placing them at increased risk of chronic disease.

Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Abbreviations: AI, Adequate Intake; BMI, body mass index; Ca, calcium; CVD, cardiovascular disease; DR, diet record; DRI, Dietary Reference Intake; DHA, docosahexaenoic acid; EAR, Estimated Average Requirement; Fe, iron; LA, linoleic acid; Mg, magnesium; NHANES, National Health and Nutrition Examination Survey; P, phosphorus; PUFA, polyunsaturated fatty acids; K, potassium; SFA, saturated fatty acids.

* Corresponding author at: USDA Human Nutrition Research Center, 2420 2nd Ave N, Grand Forks, ND 58203. Tel.: +1 701 795 8294; fax: +1 701 795 8240.

E-mail address: susan.raatz@ars.usda.gov (S.K. Raatz).

<http://dx.doi.org/10.1016/j.nutres.2017.07.010>

0271-5317/Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Smoking rates in the United States have decreased since the early 1960s when the percentage of adult smokers was 42% [1]. In 2005, the smoking incidence among US adults was 20.9%, and in 2015, it had reduced to 15.1% of the population [2]. In general, worldwide incidence of smoking has also reduced, with greater gains in reduction observed between 1990 and 2005 than 2005 and 2015 [3]. Nevertheless, although the incidence of smoking has reduced over time, it still is one of the major causes of premature death and is a risk factor for the development of chronic diseases including cancer, stroke, diabetes, cardiovascular diseases (CVDs), and respiratory diseases [4]. Many of these chronic disease states associated with smoking are also modifiable by diet. Previous studies have shown that smokers are leaner and that the nutrient quality of smokers' diets is substantially reduced compared with nonsmokers [5]. A meta-analysis from 1998 (reviewing studies published from the 1980s and 1990s) determined that nutrient intakes of smokers differed substantially from nonsmokers and that the observed differences "may exacerbate risk of the coronary heart disease and cancer associated with smoking" [6]. Not only are intakes lower, but smokers may also have increased need for specific nutrients due to the metabolic demand created by smoking [7]. For example, an early evaluation of ascorbic acid requirements in smokers showed that intakes as high as 200 mg daily were required to prevent low serum ascorbic acid levels [8], although the current Estimated Average Requirement (EAR) is set at 75 mg for adults.

Compounding the findings that nutrient intake is below recommend levels for many adults, smokers report dietary intake patterns that are less nutritious than those of nonsmokers [6–8]. As most studies evaluating nutrient intake in smokers vs nonsmokers were performed prior to the recent reduction in smoking incidence, we were interested in whether the dietary intake of current smokers continues to have reduced nutrient quality compared with nonsmokers. However, no recent articles have described the dietary intake of smokers, and none have examined intake relative to recommendations.

Our objective, therefore, was to quantify and compare reported nutrient intake in smokers and nonsmokers who were taking part in a study of stress and smoking cessation. We hypothesized (1) that overall energy and nutrient intake would be reduced in smokers compared with nonsmokers and (2) that smokers would have increased noncompliance with the Dietary Reference Intakes (DRIs). Therefore, we determined total reported energy and nutrient intake from baseline 3-day diet records (DRs) in a sample of smokers and nonsmokers who were involved in a smoking cessation study and evaluated differences in reported intake between the groups. Reported dietary intake of both groups was compared with the current DRIs to evaluate the nutritional adequacy of the reported diets [9].

2. Methods and materials

2.1. Experimental protocol

This study is an analysis of baseline 3-day dietary intake data that were collected between February 2011 and April 2014.

The main outcome, adequacy of energy and nutrient intakes, was quantified and compared between smokers prior to quitting and nonsmokers. Dietary intake reported with DR in both groups was compared with the DRI recommendations for adults aged 31–50 years. These studies were carried out at 2 sites of the University of Minnesota Medical School (Duluth, MN, and Minneapolis, MN, campuses). The research was conducted according to the guidelines proscribed in the Declaration of Helsinki, and all procedures involving human subjects were approved by the Institutional Review Boards of the University of Minnesota. All participants provided written informed consent prior to enrollment in the study.

2.2. Participants

Participants were recruited from the general population in the Duluth and Minneapolis, MN, metropolitan areas using fliers and social media for a study of examining psychobiological mechanisms of stress and smoking relapse. Smokers were recruited for participation in a ratio of 3:1 to nonsmoker controls. Eligibility criteria for participants included being between the age of 18 and 70 years old, having a body mass index (BMI) between 18 and 30, having a normal sleep schedule (bed between 9:00 PM to 12:00 AM and waking between 6:00 AM to 8:00 AM), and consuming no more than 2 alcoholic drinks per day. Potential participants were excluded if they had a current or past history of hypertension, renal or liver disease, cardiac disease, or other chronic conditions (eg, angina, coronary heart disease, arrhythmias, diabetes, thyroid disorder, or respiratory disorder). Current major psychiatric disorder (psychotic or bipolar disorder, depression, anxiety, alcohol or other drug abuse), regular use of prescription medicine or over-the-counter medications with known cardiovascular or endocrine side effects, and pregnancy were also reasons for exclusion.

2.3. Smoking status

Potential participants were assessed by interview and exhaled carbon monoxide (MicroCO monitors; Micro Direct, Inc, Lewiston, ME, USA) levels to determine their smoking status. Participants needed to smoke at least 10 cigarettes per day for the past 2 years and have a baseline carbon monoxide level of >12 ppm. Participants also needed to have a strong desire to quit smoking. A *nonsmoker* was defined as someone who had not smoked for more than 5 years and had smoked less than 100 cigarettes in their lifetime. Saliva cotinine measured by enzyme-linked immunosorbent assay (DGR Diagnostics, Marburg, Germany) was also used to verify tobacco exposure.

2.4. Anthropometry

BMI of participants was determined by measurement of height in centimeters and weight in kilograms (Pelstar Professional Health-0-Meters, McCook, IL, USA) by trained research staff.

2.5. Dietary assessment

Baseline dietary intake obtained prior to smoking cessation was used for this evaluation. Three-day DRs were used

Download English Version:

<https://daneshyari.com/en/article/5588615>

Download Persian Version:

<https://daneshyari.com/article/5588615>

[Daneshyari.com](https://daneshyari.com)