



Contents lists available at ScienceDirect

Nutrition

journal homepage: www.nutritionjrn.com

Applied nutritional investigation

Nutritional characteristics of the Japanese diet: A cross-sectional study of the correlation between Japanese Diet Index and nutrient intake among community-based elderly Japanese



Yasutake Tomata, R.D., Ph.D. *, Shu Zhang, Ph.D., Yu Kaiho, M.D., Ph.D., Fumiya Tanji, M.Sc., Yumi Sugawara, Ph.D., Ichiro Tsuji, M.D., Ph.D.

Division of Epidemiology, Department of Health Informatics and Public Health, Tohoku University School of Public Health, Graduate School of Medicine, Sendai, Japan

ARTICLE INFO

Article History:

Received 10 January 2018
Received in revised form 23 May 2018
Accepted 11 June 2018

Keywords:

Japanese diet
Dietary pattern
Nutrient
Diet quality
Cross-sectional study

ABSTRACT

Objectives: To our knowledge, the overall nutritional quality of the Japanese diet has not been assessed previously. The aim of this study was to investigate the relationship between adhering to a Japanese diet and nutrient intake.

Methods: We conducted a cross-sectional study of 1129 Japanese persons ≥ 70 y of age. Dietary habits were assessed using a food frequency questionnaire. The primary outcome was nutrient intake (12 components of NRF9.3 index). The overall nutrient adequacy (ONA) score was applied for assessing the potential of nutrient density. Correlation analysis was performed to compare the Japanese Diet Index (JDI) and nutrient intake, and multiple regression analysis was used to simulate the modified JDI (MJDI).

Results: The JDI was positively correlated with all nine beneficial nutrients, and negatively correlated with two nutrients (saturated fat and sugar). The JDI was significantly correlated with the ONA score (Spearman's coefficient = 0.248). The MJDI, which was defined by the coefficients for seven food items, was significantly correlated with the ONA score (Spearman's coefficient = 0.515). However, the JDI and MJDI were correlated with higher sodium intake.

Conclusions: The present findings suggest that adhering to a Japanese diet defined by the JDI score is associated with better nutrient intake. However, this dietary pattern also appears to be associated with high sodium intake.

© 2018 Elsevier Inc. All rights reserved.

Introduction

The Japanese diet has been widely expected to have health benefits that have contributed to the longevity of the Japanese population [1–3]. Previous studies have reported that the Japanese dietary pattern is associated with a lower risk for mortality or adverse health outcomes (e.g., disability, dementia, and depression) [4–9].

Nutritionally, ecological observations have suggested that the Japanese diet is characterized by a low fat content (particularly saturated fats) [2,3,10,11]. Although several reports have speculated that the Japanese diet has a balanced nutritional content [1], to our knowledge, its overall nutritional quality has not yet been investigated directly.

This study was supported by a Grant-in-Aid for Young Scientists (B; 15 K16201) from Japan Society for the Promotion of Science. The authors have no conflicts of interest to declare.

* Corresponding author: Tel.: +81 22 717 8123; Fax: +81 22 717 8125.

E-mail address: y-tomata@med.tohoku.ac.jp (Y. Tomata).

To understand the nutritional characteristics of the Japanese diet, examining the correlation between index of Japanese diet and nutrient density would be appropriate as a research approach [12]. The Japanese Diet Index (JDI), which is used to rate adherence to an ordinary Japanese dietary pattern, has already been adopted in previous epidemiologic studies [6,7]. In these previous epidemiologic studies, the JDI was defined by nine food items (rice, miso soup, fish, green and yellow vegetables, seaweeds, pickled vegetables, green tea, beef and pork, coffee), based on previous findings about traditional Japanese dietary patterns [13]. Therefore, examining the correlation between the JDI and nutrient density would be useful for understanding the nutritional basis of previous findings regarding the association between the JDI and adverse health outcomes [6,7].

However, because the JDI is an indicator for rating adherence to an “ordinary” Japanese dietary pattern (not necessarily the best, healthy combinations of Japanese-style food), it may include both recommended and non-recommended components [14]. For

example, a high sodium content has been pointed out as one demerit of the Japanese diet [1,14]. Therefore, it may be necessary to modify the JDI so that it better represents overall nutrient intake.

The objective of the present study was to examine the relationship between adherence to a Japanese dietary pattern and major nutrient intake. To do this, we analyzed the association between the JDI score and nutrient intake. We also conducted analyses to simulate a modified JDI (MJDI) that would predict overall nutrient adequacy.

Materials and methods

Study design

The Tsurugaya Project was a community-based, comprehensive geriatric assessment conducted with elderly Japanese individuals living in Tsurugaya district, a suburban area of Sendai City in northern Japan, between July and October 2002 [15–19].

At the time of the study, 2730 persons ≥ 70 y of age were living in Tsurugaya. We sent letters to all of them, inviting them to participate in the health survey. Of those invited, 1176 participated in the survey and provided written informed consent for inclusion in the analysis. We excluded 47 individuals for whom data on any items of the JDI were missing, leaving 1129 participants for the present analyses.

For analysis of the relationship between the JDI and blood markers of oxidative stress and inflammation, we further excluded 26 individuals who did not consent to analysis of their blood samples, and therefore a final total of 1103 participants were analyzed.

Dietary assessment

Dietary habits were assessed using a food frequency questionnaire called the Brief Self-administered Diet History Questionnaire (BDHQ), which had been used previously in a validation study [20]. The BDHQ is a 58-item questionnaire that records the consumption frequency of selected foods, but not portion size, and is designed to estimate the dietary intake of 58 food and beverage items during the preceding month. The BDHQ consists of five sections:

1. Intake frequency of food and non-alcoholic beverage items
2. Daily intake of rice and miso soup
3. Frequency of drinking and amount per drink for alcoholic beverages
4. Usual cooking methods
5. General dietary behavior

We obtained estimates of the intake volume for food items, energy, and nutrients that were calculated using an ad hoc computer algorithm for the BDHQ [20,21].

Japanese Diet Index

Based on previous studies [6,7], for calculating the JDI score, we identified nine food items: rice, miso soup, fish and shellfish, green and yellow vegetables, seaweeds, pickled vegetables, green tea, beef and pork, and coffee (corresponding food items of the BDHQ are shown in Table 1).

For each of seven components (rice, miso soup, fish and shellfish, green and yellow vegetables, seaweeds, pickled vegetables, green tea) that were consumed habitually, participants received 1 point if their intake was more than or equal to the sex-specific median. For each of the two components (beef and pork, and coffee) that were not consumed habitually, participants received 1 point if their intake was below the sex-specific median. Thus, the JDI score ranged from 0 to 9, with higher scores indicating greater dietary conformity.

Nutrient intakes and nutrient adequacy score

The primary outcome was the intake of 12 components in the NRF9.3 index (a nutrient density indicator) [22,23]. The NRF9.3 index was based on nine beneficial nutrients (protein; fiber; vitamins A, C, and E; calcium; iron; potassium; and magnesium) and on three nutrients to limit (saturated fat, sodium, and sugar).

We applied the overall nutrient adequacy (ONA) score as an external criterion to compare the potential for nutrient density between the JDI score and the MJDI score, and as a theoretical value to define the MJDI. The ONA score was generated using data for energy and nutrient intake value by the BDHQ [22,24]. With reference to the NRF9.3 index, 11 nutritional components were selected and their corresponding reference values were set according to the recommended dietary allowance (RDA) values in the Dietary Reference Intake (DRI) for Japanese 2015 (shown in Table A.1). Although the NRF9.3 index is an index calculated from 12

Table 1

Nine Components of the Japanese Diet Index and corresponding food items in the BDHQ

Components of Japanese Diet Index	Corresponding food items of BDHQ
Adhering components (7 items)	
Rice	Rice
Miso soup	Miso for miso soup
Fish and shellfish	Squid, octopus, shrimp, and clam Small fish with bones Canned tuna Dried fish and salted fish* Oily fish [†] Non-oily fish [‡]
Green and yellow vegetables	Green leafy vegetables including broccoli Carrots and pumpkins Tomatoes, tomato ketchup, boiled tomatoes, and stewed tomatoes
Seaweeds	Seaweeds
Pickled vegetables	Salted green and yellow vegetable pickles Other salted vegetable pickles (excluding salted pickled plum) Green tea
Green tea	Green tea
Non-adhering components (2 items)	
Beef and pork	Pork and beef (including ground pork and beef) Ham, sausages, and bacon
Coffee	Coffee

BDHQ, Brief-type Self-administered Diet History Questionnaire

*Includes salted mackerel, salted salmon, and dried horse mackerel.

[†]Includes sardines, mackerel, saury, amberjack, herring, eel, and fatty tuna.

[‡]Includes salmon, trout, white meat fish, freshwater fish, and bonito.

components (nine nutrients that are encouraged and three that are limited) [23], we chose all of the nutrients except sugar (thus leaving nine that are encouraged and two that are restricted) because no reference value for sugar has been established in the DRI for Japanese [25]. When nutrient intakes were calculated, each (except for saturated fat) was standardized with the sex-stratified energy intake, considering that nutrient intake may differ in terms of food intake volume and associated energy (for details see Table A.1 in the appendix, footnote) [25]. The nutrient adequacy ratios (i.e., the ratios of standardized intakes to the reference values) of 11 nutritional components were calculated (Table 1). Finally, the ONA score was generated as an average value for all 11 nutrient adequacy ratios. Thus, a high ONA score represents a diet that has a high nutrient density.

Other outcomes (biomarkers)

In the present study, 8-iso-prostaglandin (PG) F₂ α was adopted as a marker of oxidative stress, and C-reactive protein (CRP) was adopted as an inflammatory marker.

Plasma total 8-iso-PGF₂ α concentration was assayed using a specific enzyme immunoassay kit (Cayman Chemical: Ann Arbor, MI, USA) [16].

The serum CRP concentration was assayed using an immunotechnique employing a Behring BN II analyzer (Dade Behring, Tokyo, Japan) [17]. CRP concentration is known to be a prognostic factor for all-cause mortality in the general Japanese population [26].

Ethical issues

We obtained and used information for each participant in the Tsurugaya Project after confirming that written consent had been obtained. The Ethics Committee of Tohoku University Graduate School of Medicine (Sendai, Japan) reviewed and approved the study protocol.

Statistical analysis

We conducted four types of statistical analysis:

1. Correlation analysis to assess the association between the JDI and the ONA scores
2. Multiple regression analysis to simulate the MJDI
3. Correlation analysis to assess the association between Japanese dietary indices and nutrient intake

Download English Version:

<https://daneshyari.com/en/article/10023244>

Download Persian Version:

<https://daneshyari.com/article/10023244>

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