



Contents lists available at ScienceDirect

Journal of Cardiology

journal homepage: www.elsevier.com/locate/jjcc



Original article

Low frequency of toothbrushing practices is an independent risk factor for diabetes mellitus in male and dyslipidemia in female: A large-scale, 5-year cohort study in Japan

Masanari Kuwabara (MD, PhD)^{a,b,c,d,*}, Yoko Motoki (MD, PhD)^e, Hiroki Sato (MS)^f, Mizue Fujii (RN, PhD)^g, Kayoko Ichiura (RN)^h, Kazumichi Kuwabara (DDS)ⁱ, Yosikazu Nakamura (MD, MPH, FFPH)^c

^a Department of Cardiology, Toranomon Hospital, Tokyo, Japan

^b Department of Cardiology, St. Luke's International Hospital, Tokyo, Japan

^c Department of Public Health, Jichi Medical University, Shimotsuke, Japan

^d School of Medicine, University of Colorado Denver, Aurora, United States

^e Department of Obstetrics, Gynecology and Molecular Reproductive Science, Yokohama City University, Yokohama, Japan

^f Department of Preventive Medicine and Public Health, Tokyo Medical University, Tokyo, Japan

^g School of Nursing, Sapporo City University, Sapporo, Japan

^h Department of Clinical Nursing, Shiga University of Medical Science, Shiga, Japan

ⁱ Asa-Gion Dental Clinic, Hiroshima, Japan

ARTICLE INFO

Article history:

Received 27 August 2016

Received in revised form 23 September 2016

Accepted 11 October 2016

Available online xxx

Keywords:

Toothbrushing
Epidemiology
Diabetes mellitus
Dyslipidemia
Prevention

ABSTRACT

Background: We previously reported the association between toothbrushing practices and diabetes mellitus (DM) and dyslipidemia (DL) in a cross-sectional study. This study was conducted to clarify whether low frequency of toothbrushing practices is an independent risk factor for DM and DL using a follow-up design.

Methods: This study was a 5-year retrospective cohort study at St. Luke's International Hospital, Tokyo, Japan. We analyzed study subjects between 30 and 85 years old in 2004, who underwent annual medical examination both in 2004 and 2009. We compared the cumulative incidences of developing DM, DL, hypertension (HT), and hyperuricemia (HUA) between 2004 and 2009 among 3 groups: toothbrushing practices 'after every meal,' 'at least once a day,' and 'less than once a day'. Furthermore, we analyzed odds ratios (ORs) of risk for developing DM and DL by sex after making adjustments for age, obesity, DM, DL, HT, and HUA between two groups: 'after every meal' and 'not after every meal.'

Results: The number of study subjects was 13,070. Of 13,070 study subjects, 575 had DM, 5118 had DL, 2599 had HT, and 1908 had HUA in 2004. We excluded the subjects with each disease in 2004. The cumulative incidences (rates) of DM, DL, HT, and HUA between 2004 and 2009 were 318 (2.5%), 1454 (18.3%), 1108 (10.6%), and 489 (4.4%), respectively. Toothbrushing practices 'not after every meal' was a significant risk factor for developing DM in male [OR: 1.43; 95% confidence interval (CI), 1.040–1.970] and developing DL in female (OR: 1.18; 95% CI, 1.004–1.383) compared with toothbrushing practices 'after every meal.'

Conclusion: Toothbrushing practices 'after every meal' prevented developing DM in males and DL in females significantly. Toothbrushing practices may be beneficial to reduce developing risk factors for cardiovascular disease.

© 2016 Japanese College of Cardiology. Published by Elsevier Ltd. All rights reserved.

* Corresponding author at: 2-2-2, Toranomon, Minato-ku, Tokyo 105-8470, Japan. Fax: +81 3 3560 7878.
E-mail address: kuwamasa728@gmail.com (M. Kuwabara).

<http://dx.doi.org/10.1016/j.jjcc.2016.10.008>

0914-5087/© 2016 Japanese College of Cardiology. Published by Elsevier Ltd. All rights reserved.

Background

Good oral hygiene is important to prevent gingivitis and tooth decay. Toothbrushing practice is one of the best methods for oral care [1–3]. Some toothbrushing intervention programs showed promising results in reducing dental plaque formation [4]. Nonetheless, some studies showed that only toothbrushing practices were not enough to remove interproximal plaque, and therefore some additional techniques were recommended, such as floss, woodsticks, rubber tips, and interdental brushes [5]. There were many reports about the association between dental disease and cardiovascular disease [6]. Poor oral hygiene was associated with a high risk for cardiovascular disease [7]. Furthermore, an improvement in periodontal status prevented carotid intima-media thickness progression [8].

Oral hygiene is important, but it is difficult for many people to evaluate their oral conditions. We focused on the lifestyle about the frequency of toothbrushing practices because toothbrushing is one of the most familiar and easiest methods to improve oral hygiene in the general population. A recent study showed that low frequency of toothbrushing was associated with endothelial dysfunction [9], but why low frequency of toothbrushing was associated with arteriosclerosis remains unclear. Epidemiologic evidence about the association, however, should be accumulated.

We previously reported that low frequency of toothbrushing practices was associated with high prevalence of diabetes mellitus (DM) and dyslipidemia (DL) in a cross-sectional study [10]. The prior study analyzed 85,866 subjects with adjustments for age, sex, body mass index, DM, DL, hypertension (HT), hyperuricemia (HUA), chronic kidney disease, and lifestyle habits, and the results showed that low frequency of toothbrushing was significantly associated with the higher prevalence of DM [odds ratio (OR): 2.03; 95% confidence interval (CI), 1.29 to 3.21 for “less than once a day” against “after every meal”] and DL (OR: 1.50; 95% CI, 1.06 to 2.14 for “less than once a day” against “after every meal”), but not with HT, HUA, and chronic kidney disease. This fact suggested the involvement of DM and DL associated with low frequency of toothbrushing practices, but we could not detect whether low frequency of toothbrushing practices became an independent risk factor for developing DM and DL or not with considering of time processing.

This study was conducted to clarify the relationship between toothbrushing practices and the risk factors for cardiovascular disease—DM, DL, HT, and HUA using a follow-up design, which is a 5-year cohort study.

Methods

Study design and participants

The present, large-scale, single-center, epidemiological study of 5-year cohort design retrospectively analyzed the medical records of 13,070 subjects who had undergone annual medical checkup at St. Luke's International Hospital Center for Preventive Medicine, Tokyo, Japan, between January 2004 and December 2009.

In 2004, 31,233 subjects underwent annual medical examination at the hospital. After we matched each subject with their data in 2009, 13,201 subjects had useful data both from 2004 and 2009. Of those, 13,070 subjects were aged between 30 years and 85 years old in 2004. The self-administered questionnaire on toothbrushing practices in 2004 was used to categorize the study population into the following three groups according to the 3-category frequency criterion: “after every meal,” “at least once a day,” and “less than once a day.” We checked the cumulative incidences of development of new DM, DL, HT, and HUA between

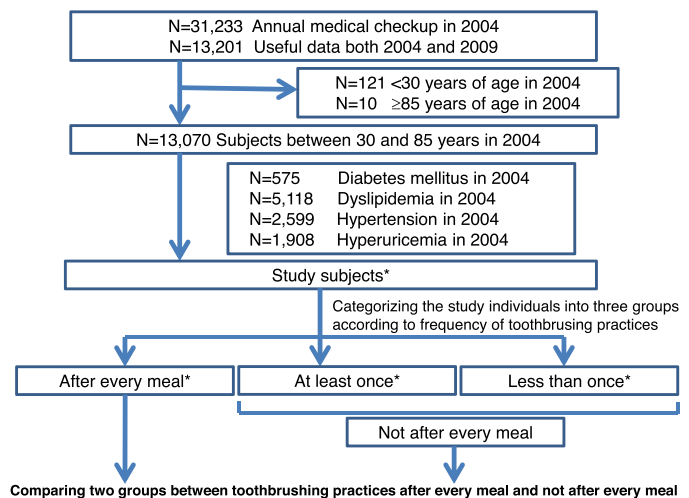


Fig. 1. Flow diagram of study subjects enrollment. *The numbers of subjects depend on the excluded participants having the corresponding disorders at baseline.

2004 and 2009, and compared the cumulative incidence rates among three groups by sex. These cumulative incidence rates were calculated by the equation: (cumulative incidence of each disease between 2004 and 2009)/(the number of subjects without each disease in 2004). Furthermore, we analyzed ORs and their 95% CIs of developing DM, DL, HT, and HUA by sex after making multiple adjustments between the two groups: high frequency of toothbrushing meant ‘after every meal’ and low frequency meant ‘not after every meal’ because the number reporting “less than once a day” was few (Fig. 1). Our previous study used this database and shared some methods similar to those of the present study [10,11].

Definition of diabetes mellitus, hypertension, dyslipidemia, hyperuricemia, and obesity

DM was defined as a glycated hemoglobin (HbA_{1c}) concentration of $\geq 6.5\%$ (as per National Glycohemoglobin Standardization Program) and/or the subjects who received medication for their diseases. DL was defined as a low-density lipoprotein cholesterol level of ≥ 140 mg/dL, a high-density lipoprotein cholesterol level of < 40 mg/dL, a triglyceride level of ≥ 150 mg/dL, and/or the subjects who received medication for their diseases. HT was defined as a systolic blood pressure (BP) of ≥ 140 mmHg, a diastolic BP of ≥ 90 mmHg, and/or the subjects who received medication for their diseases. BP was recorded using an automatic brachial sphygmomanometer (OMRON Corporation, Kyoto, Japan). BPs of the individual were measured twice after taking the sitting position and remaining quiet for longer than 5 min, with the feet on the ground and the back supported. The mean values of systolic and diastolic BP of each individual were calculated from the recorded measurements. HUA was defined as a serum uric acid concentration of > 7.0 mg/dL. HUA subgroups included the subjects who were followed up and who received medication for their diseases. This definition was from the Japanese guideline for the management of hyperuricemia and gout: second edition [12]. Obesity was defined as body mass index of ≥ 25 kg/m².

Statistical analysis

Pairwise comparison of the cumulative incidence rates of DM, DL, HT, and HUA between 2004 and 2009 among 3 toothbrushing groups was done by logistic regression model. Relationship between risk factors at the baseline and developing new DM and DL was assessed using logistic regression analysis by sex.

Download English Version:

<https://daneshyari.com/en/article/5614658>

Download Persian Version:

<https://daneshyari.com/article/5614658>

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