**Supporting information**

“Adherence to the food-based Japanese dietary guidelines and prevalence of poor oral health–related quality of life among older Japanese adults in the Kyoto–Kameoka study”

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**Table S1**. Comparison of characteristics of the participants with complete and missing data in this study

|  |  |  |  |
| --- | --- | --- | --- |
| 　 | Complete case (*n* = 5350)　　　　　　　　　　　　　 | Missing case(*n* = 2634)　　　　　　　　　　　　　 | *p*-value |
|  |
| *n* | % | *n* | % |  |
| Age [years]† |  |  |  |  |  |  |
|  Mean | 72.8 | 74.7 | <0.001 |  |
|  SD | 6.0 | 6.3 |  |  |
| Women [*n* (%)]‡ | 2823 | (52.8) | 1411 | (53.6) | 0.456 |  |
| PD ≥1000 people/km2 [*n* (%)]‡ | 2457 | (45.9) | 1198 | (45.5) | 0.140 |  |
| BMI [kg/m2]† |  |  |  |  |  |  |
|  Mean | 22.6 | 22.6 | 0.485 |  |
|  SD | 3.0 | 3.1 |  |  |
| Alcohol drinker [*n* (%)]‡ | 3514 | (65.7) | 1686 | (64.0) | 0.140 |  |
| Current smoker [*n* (%)]‡ | 566 | (10.6) | 277 | (10.5) | 0.931 |  |
| MVPA [*n* (%)]‡ | 2451 | (45.8) | 1145 | (43.5) | 0.048 |  |
| Living alone [*n* (%)]‡ | 597 | (11.2) | 323 | (12.3) | 0.146 |  |
| HSES [*n* (%)]‡ | 1846 | (34.5) | 901 | (34.2) | 0.792 |  |
| Education ≥13 y [*n* (%)]‡ | 1184 | (22.1) | 554 | (21.0) | 0.076 |  |
| Denture use [*n* (%)]‡ | 3190 | (59.6) | 1701 | (64.6) | <0.001 |  |
| Poor mastication [*n* (%)]‡ | 1623 | (30.3) | 898 | (34.1) | 0.001 |  |
| Dry mouth [*n* (%)]‡ | 1478 | (27.6) | 760 | (28.9) | 0.251 |  |
| Choking accidents [*n* (%)]‡ | 1098 | (20.5) | 556 | (21.1) | 0.544 |  |
| Regular dental check-up [*n* (%)]‡ | 2085 | (39.0) | 953 | (36.2) | 0.016 |  |
| Daily tooth brushing [*n* (%)]‡ | 4947 | (92.5) | 2429 | (92.2) | 0.692 |  |
| No medication [*n* (%)]‡ | 1254 | (23.4) | 551 | (20.9) | 0.011 |  |
| Hypertension [*n* (%)]‡ | 1981 | (37.0) | 1025 | (38.9) | 0.102 |  |
| Stroke [*n* (%)]‡ | 178 | (3.3) | 95 | (3.6) | 0.518 |  |
| Heart disease [*n* (%)]‡ | 601 | (11.2) | 344 | (13.1) | 0.018 |  |
| Diabetes [*n* (%)]‡ | 556 | (10.4) | 240 | (9.1) | 0.072 |  |
| Dyslipidaemia [*n* (%)]‡ | 529 | (9.9) | 234 | (8.9) | 0.151 |  |

Multiple imputations were performed for participants with missing data, and missing variables were imputed: BMI (*n* = 39; 0.5%), alcohol status (*n* = 305; 3.8%), smoking status (*n* = 358; 4.5%), physical activity (*n* = 543; 6.8%), family structure (*n* = 618; 7.7%), socioeconomic status (*n* = 382; 4.8%), educational attainment (*n* = 926; 11.6%), denture use (*n* = 217; 2.7%), poor mastication (*n* = 197; 2.5%), dry mouth (*n* = 266; 3.3%), choking accidents (*n* = 181; 2.3%), regular dental check-up (*n* = 332; 4.2%), daily tooth brushing (*n* = 214; 2.7%), and medications (*n* = 632; 7.9%). BMI, body mass index; HSES, high socioeconomic status; MVPA, moderate to vigorous physical activity; PD, population density.

†Continuous variables are shown as mean with standard deviation.

‡Categorical values are shown as numbers (percentage). MVPA refers to those who had MVPA exercise habits from a questionnaire. Have you choked on your tea or soup recently? If a participant responded “Yes” to this question, this was defined as “choking accidents”.

**Table S2**. Stratified multivariable logistic regression analyses of sex and denture use for the prevalence of poor oral health-related quality of life according to the score for adherence to the Japanese Food Guide Spinning Top

|  |  |  |  |
| --- | --- | --- | --- |
| 　 | Quartile of the Japanese food guide Spinning Top score | 10 points increment | *p* for trend† |
| Q1 | Q2 | Q3 | Q4 |
| ***Women, n*** | 1,059 | 1,059 | 1,058 | 1,058 |  |  |  |
| Mean (SD) score | 46.5 | (5.7) | 54.6 | (1.4) | 59.4 | (1.4) | 65.5 | (2.8) |  |  |  |
| Case [*n* (%)] | 407 | (38.4) | 335 | (31.6) | 279 | (26.4) | 264 | (25.0) |  |  |  |
| Model 1‡,¶ | 1.00 | (Ref) | 0.80 | (0.67 to 0.96) | 0.69 | (0.57 to 0.84) | 0.57 | (0.46 to 0.72) | 0.75 | (0.67 to 0.83) | **<0.001**  |
| Model 2§,¶ | 1.00 | (Ref) | 0.88 | (0.71 to 1.09) | 0.72 | (0.59 to 0.89) | 0.64 | (0.52 to 0.79) | 0.80 | (0.71 to 0.89) | **<0.001**  |
| Model 3||,¶ | 1.00 | (Ref) | 0.85 | (0.67 to 1.07) | 0.77 | (0.61 to 0.88) | 0.70 | (0.56 to 0.88) | 0.83 | (0.73 to 0.92) | **<0.001**  |
| ***Men, n*** | 938 | 938 | 937 | 937 |  |  |  |
| Mean (SD) score | 40.9 | (5.2) | 49.5 | (1.6) | 54.8 | (1.5) | 61.7 | (3.2) |  |  |  |
| Case [*n* (%)] | 327 | (34.9) | 293 | (31.2) | 274 | (29.2) | 237 | (25.3) |  |  |  |
| Model 1‡,¶ | 1.00 | (Ref) | 0.87 | (0.71 to 1.08) | 0.67 | (0.55 to 0.83) | 0.58 | (0.47 to 0.71) | 0.78 | (0.69 to 0.86) | **<0.001**  |
| Model 2§,¶ | 1.00 | (Ref) | 0.86 | (0.72 to 1.03) | 0.76 | (0.63 to 0.93) | 0.65 | (0.51 to 0.81) | 0.83 | (0.74 to 0.91) | **<0.001**  |
| Model 3||,¶ | 1.00 | (Ref) | 0.88 | (0.72 to 1.07) | 0.76 | (0.61 to 0.94) | 0.75 | (0.59 to 0.97) | 0.87 | (0.77 to 0.96) | **0.007** |
| ***Denture use, n*** | 1,223 | 1,223 | 1,223 | 1,222 |  |  |  |
| Mean (SD) score | 42.7 | (5.8) | 51.9 | (1.6) | 57.1 | (1.6) | 64.0 | (3.1) |  |  |  |
| Case [*n* (%)] | 503 | (41.1) | 491 | (40.2) | 424 | (34.7) | 390 | (31.9) |  |  |  |
| Model 1‡ | 1.00 | (Ref) | 0.91 | (0.77 to 1.07) | 0.75 | (0.63 to 0.88) | 0.63 | (0.53 to 0.75) | 0.81 | (0.74 to 0.88) | **<0.001**  |
| Model 2§ | 1.00 | (Ref) | 0.94 | (0.80 to 1.10) | 0.80 | (0.68 to 0.95) | 0.69 | (0.58 to 0.83) | 0.85 | (0.78 to 0.92) | **<0.001**  |
| Model 3||,¶ | 1.00 | (Ref) | 0.93 | (0.78 to 1.10) | 0.77 | (0.64 to 0.93) | 0.73 | (0.61 to 0.89) | 0.85 | (0.77 to 0.93) | **<0.001**  |
| ***Non-denture use, n*** | 774 | 773 | 773 | 773 |  |  |  |
| Mean (SD) score | 44.2 | (5.0) | 52.7 | (1.6) | 57.9 | (1.5) | 64.3 | (2.9) |  |  |  |
| Case [*n* (%)] | 201 | (26.0) | 148 | (19.2) | 138 | (17.9) | 121 | (15.7) |  |  |  |
| Model 1‡ | 1.00 | (Ref) | 0.71 | (0.55 to 0.91) | 0.61 | (0.47 to 0.78) | 0.51 | (0.40 to 0.67) | 0.71 | (0.60 to 0.82) | **<0.001**  |
| Model 2§ | 1.00 | (Ref) | 0.75 | (0.58 to 0.97) | 0.67 | (0.52 to 0.88) | 0.57 | (0.43 to 0.75) | 0.76 | (0.64 to 0.88) | **<0.001**  |
| Model 3||,¶ | 1.00 | (Ref) | 0.76 | (0.57 to 1.00) | 0.81 | (0.61 to 1.07) | 0.70 | (0.52 to 0.94) | 0.85 | (0.72 to 0.98) | **0.020** |

All values are expressed as mean (SD), number (%), or relative OR (95% CI). All estimates were derived from the multivariable logistic regression model. Poor OHRQoL is defined as a score ≤ 50 on a validated GOHAI. Bold *p* values are statistically signiﬁcant (*p* < 0.05). Q1 through Q4 include of the Japanese Food Guide Spinning Top score of <52.0, 52.0–57.0, 57.1–61.8, and ≥61.9 score in women; <46.4, 46.4–52.2, 52.3–57.5, and ≥57.6 scores in men; <48.9, 48.9–54.5, 54.6–59.9, and ≥60.0 scores in participants with denture use; and <49.7, 49.7–55.4, 55.5–60.4, and ≥60.5 scores in participants with non-denture use. CI, confidence interval; GOHAI, Geriatric Oral Health Assessment Index; OR, odds ratio; OHRQoL, oral health-related quality of life; Ref, reference; SD, standard deviation.

†Linear trend *p* values were calculated using the likelihood ratio test and a continuous variable of adherence score.

‡Model 1 was adjusted for age, sex, and population density.

§Model 2 was Model 1 plus adjustment for BMI, moderate physical activity, smoking status, alcohol status, education, medications, living alone, socioeconomic status, green tea consumption, coffee consumption, and history of disease (hypertension, diabetes mellitus, dyslipidaemia, heart disease, and stroke).

||Model 3 was Model 2 plus mutual adjustment for denture use, poor mastication, dry mouth, choking accidents, regular dental check-up, and daily tooth brushing.

¶Variables (sex or denture use) used for subgroup analysis were excluded from the adjustment in covariate variables in model.

**Table S3**. Least squares mean for the scores of the GOHAI subdomains according to the score for adherence to the Japanese Food Guide Spinning Top calculated using the multivariable least squares regression model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 　 | Quartile of the Japanese food guide Spinning Top score | 　 | 10 points increment | *p* for trend† |
| Q1(*n* = 1996)　 | Q2(*n* = 1996)　 | Q3(*n* = 1996)　 | Q4(*n* = 1996)　 | 　 |
| **Total score** |  |  |  |  |  |  |  |  |  | 　 | 　 |  |
| Model 1‡ | 58.9 | (55.7 to 62.1) | 59.4 | (56.2 to 62.6) | 59.8 | (56.6 to 63.0) | 60.4 | (57.2 to 63.6) |  | 0.7 | (0.5 to 1.0) | <0.001  |
| Model 2§ | 55.8 | (52.6 to 58.9) | 56.3 | (53.1 to 59.4) | 56.6 | (53.4 to 59.8) | 57.1 | (53.9 to 60.3) |  | 0.7 | (0.4 to 0.9) | <0.001  |
| Model 3|| | 55.5 | (52.3 to 58.6) | 56.0 | (52.8 to 59.1) | 56.3 | (53.2 to 59.5) | 56.8 | (53.6 to 59.9) |  | 0.7 | (0.4 to 0.9) | <0.001  |
| **Physical functioning** |  |  |  |  |  |  |  |  |  |  |  |  |
| Model 1‡ | 26.3 | (24.8 to 27.8) | 26.6 | (25.0 to 28.1) | 26.8 | (25.2 to 28.3) | 27.1 | (25.5 to 28.6) |  | 0.4 | (0.3 to 0.5) | <0.001  |
| Model 2§ | 24.6 | (23.1 to 26.1) | 24.8 | (23.3 to 26.3) | 25.0 | (23.5 to 26.5) | 25.2 | (23.7 to 26.7) |  | 0.3 | (0.2 to 0.4) | <0.001  |
| Model 3|| | 24.5 | (23.0 to 26.0) | 24.8 | (23.3 to 26.2) | 24.9 | (23.4 to 26.4) | 25.2 | (23.7 to 26.7) |  | 0.3 | (0.2 to 0.4) | <0.001  |
| **Psychosocial functioning** |  |  |  |  |  |  |  |  |  |  |  |  |
| Model 1‡ | 23.9 | (22.4 to 25.3) | 24.1 | (22.6 to 25.6) | 24.3 | (22.8 to 25.7) | 24.5 | (23.0 to 25.9) |  | 0.3 | (0.2 to 0.4) | <0.001  |
| Model 2§ | 22.6 | (21.1 to 24.0) | 22.8 | (21.3 to 24.3) | 22.9 | (21.5 to 24.4) | 23.1 | (21.6 to 24.6) |  | 0.3 | (0.2 to 0.4) | <0.001  |
| Model 3|| | 22.4 | (21.0 to 23.9) | 22.6 | (21.2 to 24.1) | 22.8 | (21.3 to 24.2) | 22.9 | (21.5 to 24.4) |  | 0.3 | (0.2 to 0.4) | <0.001  |
| **Pain and discomfort** |  |  |  |  |  |  |  |  |  |  |  |  |
| Model 1‡ | 8.7 | (8.2 to 9.3) | 8.8 | (8.2 to 9.3) | 8.8 | (8.3 to 9.3) | 8.9 | (8.3 to 9.4) |  | 0.1 | (0.0 to 0.1) | <0.001  |
| Model 2§ | 8.6 | (8.1 to 9.2) | 8.7 | (8.1 to 9.2) | 8.7 | (8.1 to 9.2) | 8.8 | (8.2 to 9.3) |  | 0.1 | (0.0 to 0.1) | <0.001  |
| Model 3|| | 8.5 | (8.0 to 9.0) | 8.6 | (8.0 to 9.1) | 8.6 | (8.1 to 9.2) | 8.7 | (8.2 to 9.2) | 　 | 0.1 | (0.0 to 0.1) | <0.001  |

All values are expressed as least squares mean (95% CI). All estimates were derived from the multivariable least squares regression model. The high scores of the GOHAI subdomains means best oral status; total (score range; 12 to 60), physical functioning (score range; 5 to 25), psychosocial functioning (score range; 5 to 25), and pain and discomfort (score range; 2 to 10). Bold *p* values are statistically signiﬁcant (*p* < 0.05). Q1 through Q4 include of the Japanese Food Guide Spinning Top score of <49.3, 49.3–54.8, 54.9–60.1, and ≥60.2 scores. CI, confidence interval; GOHAI, Geriatric Oral Health Assessment Index.

†Linear trend *p* values were calculated by using a continuous variable of adherence score.

‡Model 1 was adjusted for age, sex, and population density.

§Model 2 was as Model 1 plus adjustment for BMI, moderate physical activity, smoking status, alcohol status, education, medications, living alone, socioeconomic status, green tea consumption, coffee consumption, and history of disease (hypertension, diabetes mellitus, dyslipidaemia, heart disease, and stroke).

||Model 3 was as Model 2 plus mutual adjustment for denture use, poor mastication, dry mouth, choking accidents, regular dental check-up, and daily tooth brushing.