

SECTION 4

Nutrition and Disease in the Japan Collaborative Cohort Study for Evaluation of Cancer (JACC)

Hiroyasu Iso, Yoshimi Kubota

Abstract

Nutrition effects on mortality in the Japan Collaborative Cohort Study (JACC Study) were investigated using interview and follow up. Multivitamin and vitamin E use was found to be associated with lower mortality from cerebrovascular disease (CVD). For all causes, CVD and ischemic heart disease (IHD), total energy intake and cutting breakfast were associated with elevated, while rice intake, fruit, sweets, tofu, pickles, dried fish, deep-fried foods, tea and coffee and seaweed were generally linked with lowered mortality. Consistent across the sexes, protection was evident against lung cancer with seaweed, prostate cancer with fresh fish, and liver cancer with pork and rice intake. Positive associations were found between potato consumption and colon cancer, as well as for fat intake and liver cancer. Clearly, the diet has a major impact on chronic disease processes in the Japanese population.

Keywords: Nutrition - dietary factors - cancer - cardiovascular disease - ischemic heart disease

Asian Pacific J Cancer Prev, 8, JACC Supplement, 35-80

Introduction

We investigated systematically the relationships of food and supplements with risk of mortality from total cancer, cancers of esophagus, stomach, colon, rectum, liver, gall bladder, pancreas, lung, breast, cervical uterus, prostate, kidney and urinary-tract, Hodgkin/non-Hodgkin lymphoma, multiple myeloma, leukemia, and ischemic heart disease and cerebrovascular disease. We did not present the data on associations between nutrient intakes and disease and some of them were reported elsewhere (Wakai et al, 2005).

We focused the findings of sex-specific, age-adjusted relative risks of statistical significance or borderline significance. Inconsistent results between the sexes, except for gender-specific cancers were interpreted carefully since the finding may be observed by chance or by confounding factors. Mechanisms for disease associations are discussed.

Materials and Methods

Each participant was asked to record dietary patterns, preference, and the frequency of the intake of 39 foods (Iso et al, 2005). Five responses were possible for each food item: "rarely," "1 to 2 days per month," "1 to 2 days per week," "3 to 4 days per week," and "almost every day". The validity for the food frequency questionnaire was examined previously (Ozasa et al, 2005a; 2005b; Wakai et al, 2005). For each participant, the person years of follow-up were calculated from the date of filling out the baseline questionnaire to death, moving out of the community, or the end of 2003, whichever was first. The sex-specific relative risks of total mortality and cause-

specific mortality cerebrovascular disease were defined as the death rate among participants according to the responses to the diet questionnaire. The sex-specific and age-adjusted relative risks and their 95% confidence intervals were calculated after adjustment for age and area of the study by using the Cox proportional hazard model.

Results

Vitamin supplements (Table 1)

We investigated the relationships of multivitamin, vitamins B1, C and E, liver oil, and other supplements with risk of mortality. The use of multivitamin was associated with lower mortality from cerebrovascular disease for women; a similar but weak trend was observed for men. The use of vitamin E was associated with lower mortality from cerebrovascular disease for men and women. Otherwise, there were no consistent associations between the supplement use and disease for both sexes. The excess mortality from liver cancer associated with multivitamin use and ischemic heart disease associated with vitamin B1 were observed only for women. The excess mortality from prostate cancer associated with vitamin B1 and gall bladder cancer associated with vitamin C use was observed for men.

Dietary habits and patterns (Table 2)

The Japanese-style breakfast was associated with lower mortality from all causes for men while cutting of breakfast was associated with higher mortality from all causes for men and women. The western-style breakfast was associated with lower mortality from stomach cancer and ischemic heart disease for men and cerebrovascular

Public Health, Department of Social and Environmental Medicine, Osaka University Graduate School of Medicine, 2-2 Yamadaoka Suita, Osaka 565-0871, Japan, Fax +81-6-6879-3919, E-mail for correspondence: iso@pbhel.med.osaka-u.ac.jp (Prof Iso)

Table 1. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Supplements

| | No. of subjects | Person -years | All causes | | All cancers | | Esophageal cancer | | Stomach cancer | | Colon cancer | | Rectal cancer | | Liver cancer | |
|------------------|-----------------|---------------|------------|-----------------|-------------|-----------------|-------------------|------------------|----------------|------------------|--------------|------------------|---------------|------------------|--------------|------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | | | |
| no use | 40,017 | 503,398 | 8,946 | 1.00 | 3,410 | 1.00 | 139 | 1.00 | 686 | 1.00 | 183 | 1.00 | 143 | 1.00 | 405 | 1.00 |
| use | 4,630 | 55,092 | 897 | 1.02(0.95-1.10) | 353 | 1.02(0.92-1.15) | 12 | 0.74(0.40-1.35) | 64 | 0.96(0.74-1.26) | 31 | 1.52(1.03-2.27)* | 16 | 1.09(0.64-1.86) | 38 | 1.08(0.76-1.53) |
| Vitamin B1 | | | | | | | | | | | | | | | | |
| no use | 42,779 | 535,420 | 9,391 | 1.00 | 3,581 | 1.00 | 145 | 1.00 | 718 | 1.00 | 202 | 1.00 | 155 | 1.00 | 414 | 1.00 |
| use | 1,767 | 22,143 | 433 | 0.97(0.88-1.07) | 172 | 1.01(0.86-1.18) | 6 | 0.90(0.39-2.05) | 30 | 0.91(0.63-1.31) | 12 | 1.19(0.66-2.16) | 3 | 0.37(0.12-1.18)* | 28 | 1.22(0.83-1.81) |
| Vitamin C | | | | | | | | | | | | | | | | |
| no use | 42,867 | 537,309 | 9,450 | 1.00 | 3,622 | 1.00 | 147 | 1.00 | 725 | 1.00 | 205 | 1.00 | 153 | 1.00 | 428 | 1.00 |
| use | 1,657 | 20,054 | 371 | 1.06(0.95-1.18) | 131 | 0.96(0.81-1.15) | 4 | 0.70(0.26-1.89) | 23 | 0.88(0.58-1.34) | 9 | 1.04(0.53-2.04) | 5 | 0.84(0.34-2.07) | 14 | 0.80(0.47-1.37) |
| Vitamin E | | | | | | | | | | | | | | | | |
| no use | 43,286 | 542,260 | 9,556 | 1.00 | 3,651 | 1.00 | 148 | 1.00 | 736 | 1.00 | 202 | 1.00 | 155 | 1.00 | 424 | 1.00 |
| use | 1,248 | 15,225 | 262 | 0.92(0.81-1.04) | 101 | 0.91(0.75-1.11) | 3 | 0.68(0.22-2.15) | 12 | 0.57(0.32-1.02)* | 12 | 1.76(0.98-3.17)* | 3 | 0.61(0.19-1.92) | 18 | 1.23(0.76-1.98) |
| Liver oil | | | | | | | | | | | | | | | | |
| no use | 44,275 | 554,567 | 9,764 | 1.00 | 3,734 | 1.00 | 151 | 1.00 | 746 | 1.00 | 212 | 1.00 | 158 | 1.00 | 438 | 1.00 |
| use | 226 | 2,612 | 52 | 0.97(0.74-1.28) | 18 | 0.91(0.57-1.45) | 0 | NA | 2 | 0.55(0.14-2.22) | 2 | 1.46(0.36-5.91) | 0 | NA | 4 | 1.81(0.67-4.88) |
| Other supplement | | | | | | | | | | | | | | | | |
| no use | 42,758 | 535,475 | 9,428 | 1.00 | 3,592 | 1.00 | 147 | 1.00 | 718 | 1.00 | 203 | 1.00 | 151 | 1.00 | 424 | 1.00 |
| use | 1,848 | 22,663 | 399 | 0.98(0.89-1.09) | 164 | 1.04(0.89-1.22) | 4 | 0.56(0.21-1.52) | 30 | 0.99(0.68-1.43) | 12 | 1.22(0.68-2.20) | 7 | 0.99(0.46-2.12) | 19 | 1.17(0.73-1.86) |
| Women | | | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | | | |
| no use | 55,366 | 721,071 | 6,308 | 1.00 | 2,027 | 1.00 | 21 | 1.00 | 343 | 1.00 | 184 | 1.00 | 78 | 1.00 | 195 | 1.00 |
| use | 5,616 | 67,398 | 527 | 0.98(0.90-1.08) | 191 | 1.08(0.93-1.26) | 3 | 1.58(0.45-5.48) | 25 | 0.81(0.54-1.23) | 25 | 1.42(0.92-2.19) | 6 | 0.96(0.41-2.24) | 24 | 1.63(1.04-2.55)* |
| Vitamin B1 | | | | | | | | | | | | | | | | |
| no use | 58,236 | 753,802 | 6,474 | 1.00 | 2,119 | 1.00 | 22 | 1.00 | 350 | 1.00 | 201 | 1.00 | 81 | 1.00 | 207 | 1.00 |
| use | 2,617 | 33,417 | 356 | 1.03(0.93-1.15) | 96 | 0.88(0.71-1.08) | 2 | 2.31(0.53-10.17) | 18 | 0.97(0.60-1.56) | 8 | 0.80(0.39-1.63) | 3 | 0.69(0.22-2.22) | 12 | 1.01(0.56-1.83) |
| Vitamin C | | | | | | | | | | | | | | | | |
| no use | 57,564 | 746,116 | 6,528 | 1.00 | 2,108 | 1.00 | 23 | 1.00 | 354 | 1.00 | 197 | 1.00 | 79 | 1.00 | 206 | 1.00 |
| use | 3,271 | 40,968 | 299 | 0.93(0.82-1.04) | 107 | 0.96(0.79-1.17) | 1 | 1.23(0.16-9.39) | 14 | 0.75(0.43-1.28) | 12 | 1.18(0.65-2.13) | 5 | 1.22(0.49-3.04) | 13 | 1.11(0.63-1.97) |
| Vitamin E | | | | | | | | | | | | | | | | |
| no use | 56,607 | 733,636 | 6,458 | 1.00 | 2,069 | 1.00 | 23 | 1.00 | 344 | 1.00 | 198 | 1.00 | 77 | 1.00 | 204 | 1.00 |
| use | 4,276 | 53,935 | 372 | 0.92(0.83-1.03) | 149 | 1.06(0.89-1.25) | 1 | 0.95(0.12-7.25) | 25 | 1.07(0.71-1.62) | 11 | 0.86(0.46-1.59) | 7 | 1.36(0.62-3.00) | 15 | 0.97(0.57-1.67) |
| Liver oil | | | | | | | | | | | | | | | | |
| no use | 60,303 | 780,746 | 6,776 | 1.00 | 2,197 | 1.00 | 23 | 1.00 | 365 | 1.00 | 207 | 1.00 | 83 | 1.00 | 216 | 1.00 |
| use | 488 | 5,909 | 51 | 1.02(0.78-1.35) | 19 | 1.14(0.73-1.80) | 1 | 7.05(0.92-54.3)* | 3 | 1.07(0.34-3.34) | 2 | 1.19(0.29-4.83) | 1 | 1.84(0.25-13.4) | 3 | 1.98(0.63-6.25) |
| Other supplement | | | | | | | | | | | | | | | | |
| no use | 57,942 | 751,062 | 6,505 | 1.00 | 2,113 | 1.00 | 24 | 1.00 | 352 | 1.00 | 199 | 1.00 | 79 | 1.00 | 206 | 1.00 |
| use | 3,050 | 37,492 | 329 | 0.99(0.88-1.10) | 105 | 0.96(0.78-1.16) | 0 | NA | 17 | 0.88(0.54-1.45) | 10 | 0.88(0.47-1.68) | 5 | 1.38(0.55-3.44) | 13 | 1.31(0.74-2.32) |

*Adjusted for age and area of study. ** p<0.01; * p<0.05; †p<0.10 NA: not applicable

Table 1. Continued. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Supplements

| | No. of subjects | Person -years | Gall bladder cancer | | Pancreas cancer | | Lung cancer | | Breast cancer | | Uterine cervix cancer | | Prostate cancer | |
|-------------------------|-----------------|---------------|---------------------|------------------|-----------------|---------------------|------------------|------------------|---------------|-----------------|-----------------------|------------------|------------------|-----------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | |
| no use | 40,017 | 503,398 | 67 | 1.00 | 195 | 1.00 | 789 | 1.00 | NA | NA | NA | 149 | 1.00 | NA |
| use | 4,630 | 55,092 | 2 | 0.32(0.08-1.32) | 19 | 1.00(0.62-1.63) | 80 | 0.97(0.77-1.23) | NA | NA | NA | 14 | 1.00(0.57-1.77) | NA |
| Vitamin B1 | | | | | | | | | | | | | | |
| no use | 42,779 | 535,420 | 65 | 1.00 | 200 | 1.00 | 838 | 1.00 | NA | NA | NA | 149 | 1.00 | NA |
| use | 1,767 | 22,143 | 4 | 1.29(0.46-3.62) | 12 | 1.40(0.77-2.54) | 29 | 0.77(0.53-1.12) | NA | NA | NA | 14 | 1.92(1.09-3.37)* | NA |
| Vitamin C | | | | | | | | | | | | | | |
| no use | 42,867 | 537,309 | 63 | 1.00 | 208 | 1.00 | 843 | 1.00 | NA | NA | NA | 156 | 1.00 | NA |
| use | 1,657 | 20,054 | 6 | 2.81(1.20-6.62)* | 4 | 0.56(0.21-1.50) | 24 | 0.79(0.53-1.19) | NA | NA | NA | 7 | 1.14(0.53-2.45) | NA |
| Vitamin E | | | | | | | | | | | | | | |
| no use | 43,286 | 542,260 | 65 | 1.00 | 208 | 1.00 | 846 | 1.00 | NA | NA | NA | 159 | 1.00 | NA |
| use | 1,248 | 15,225 | 4 | 2.22(0.79-6.20) | 4 | 0.69(0.25-1.87) | 20 | 0.82(0.53-1.29) | NA | NA | NA | 4 | 0.78(0.29-2.11) | NA |
| Liver oil | | | | | | | | | | | | | | |
| no use | 44,275 | 554,567 | 68 | 1.00 | 212 | 1.00 | 860 | 1.00 | NA | NA | NA | 163 | 1.00 | NA |
| use | 226 | 2,612 | 1 | 3.01(0.41-22.2) | 0 | NA | 6 | 1.34(0.60-2.99) | NA | NA | NA | 0 | NA | NA |
| Other supplement | | | | | | | | | | | | | | |
| no use | 42,758 | 535,475 | 67 | 1.00 | 196 | 1.00 | 819 | 1.00 | NA | NA | NA | 157 | 1.00 | NA |
| use | 1,848 | 22,663 | 2 | 0.72(0.18-2.98) | 16 | 2.02(1.20-3.40)**47 | 1.30(0.96-1.75)* | NA | NA | NA | NA | 6 | 0.88(0.38-2.00) | NA |
| Women | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | |
| no use | 55,366 | 721,071 | 83 | 1.00 | 187 | 1.00 | 231 | 1.00 | 92 | 1.00 | 32 | 1.00 | NA | NA |
| use | 5,616 | 67,398 | 7 | 0.97(0.44-2.14) | 20 | 1.17(0.73-1.88) | 23 | 1.05(0.67-1.63) | 7 | 0.93(0.42-2.05) | 3 | 0.99(0.30-3.34) | NA | NA |
| Vitamin B1 | | | | | | | | | | | | | | |
| no use | 58,236 | 753,802 | 89 | 1.00 | 194 | 1.00 | 247 | 1.00 | 95 | 1.00 | 33 | 1.00 | NA | NA |
| use | 2,617 | 33,417 | 1 | 0.24(0.03-1.73) | 13 | 1.43(0.81-2.54) | 7 | 0.50(0.24-1.07)* | 4 | 0.89(0.32-2.47) | 2 | 1.17(0.27-4.98) | NA | NA |
| Vitamin C | | | | | | | | | | | | | | |
| no use | 57,564 | 746,116 | 86 | 1.00 | 197 | 1.00 | 239 | 1.00 | 93 | 1.00 | 31 | 1.00 | NA | NA |
| use | 3,271 | 40,968 | 4 | 0.95(0.35-2.64) | 10 | 1.01(0.53-1.92) | 15 | 1.06(0.63-1.81) | 6 | 1.21(0.52-2.80) | 4 | 2.46(0.85-7.14)* | NA | NA |
| Vitamin E | | | | | | | | | | | | | | |
| no use | 56,607 | 733,636 | 86 | 1.00 | 196 | 1.00 | 235 | 1.00 | 94 | 1.00 | 32 | 1.00 | NA | NA |
| use | 4,276 | 53,935 | 4 | 0.75(0.27-2.09) | 11 | 0.89(0.48-1.65) | 19 | 1.05(0.65-1.69) | 5 | 0.73(0.29-1.82) | 3 | 1.30(0.39-4.35) | NA | NA |
| Liver oil | | | | | | | | | | | | | | |
| no use | 60,303 | 780,746 | 90 | 1.00 | 206 | 1.00 | 253 | 1.00 | 98 | 1.00 | 34 | 1.00 | NA | NA |
| use | 488 | 5,909 | 0 | NA | 1 | 0.57(0.08-4.04) | 2 | 0.97(0.24-3.90) | 1 | 1.57(0.22-11.4) | 1 | 4.28(0.57-32.0) | NA | NA |
| Other supplement | | | | | | | | | | | | | | |
| no use | 57,942 | 751,062 | 87 | 1.00 | 196 | 1.00 | 243 | 1.00 | 96 | 1.00 | 34 | 1.00 | NA | NA |
| use | 3,050 | 37,492 | 4 | 0.89(0.32-2.45) | 11 | 1.04(0.56-1.92) | 12 | 0.84(0.47-1.52) | 3 | 0.78(0.24-2.48) | 1 | 0.60(0.08-4.41) | NA | NA |

*Adjusted for age and area of study. ** p<0.01; * p<0.05; †p<0.10 NA: not applicable

Table 1. Continued. Age-adjusted Hazard Ratios[#] and 95% Confidence Intervals(95% CI) According to Supplements

| | No. of subjects | Person -years | Kidney cancer | | Urothelial tract cancer | | Non-Hodgkin's | | Multiple myeloma | | Myeloid leukemia | | Ischemic heart disease | | Cerebrovascular | |
|-------------------------|-----------------|---------------|---------------|-----------------|-------------------------|------------------|---------------|------------------------------|------------------|-----------------|------------------|------------------|------------------------|------------------------------|-----------------|------------------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | | | |
| no use | 40,017 | 503,398 | 41 | 1.00 | 76 | 1.00 | 82 | 1.00 | 45 | 1.00 | 38 | 1.00 | 572 | 1.00 | 1,172 | 1.00 |
| use | 4,630 | 55,092 | 3 | 0.61(0.19-2.01) | 15 | 2.08(1.15-3.75)* | 7 | 0.88(0.40-1.95) | 4 | 0.94(0.33-2.68) | 6 | 1.28(0.53-3.11) | 64 | 1.17(0.90-1.53) | 105 | 0.91(0.74-1.12) |
| Vitamin B1 | | | | | | | | | | | | | | | | |
| no use | 42,779 | 535,420 | 43 | 1.00 | 85 | 1.00 | 85 | 1.00 | 46 | 1.00 | 39 | 1.00 | 607 | 1.00 | 1,223 | 1.00 |
| use | 1,767 | 22,143 | 1 | 0.41(0.06-3.01) | 6 | 1.47(0.63-3.42) | 4 | 1.00(0.36-2.76) | 3 | 1.20(0.37-3.93) | 5 | 2.80(1.08-7.30)* | 29 | 1.06(0.72-1.54) | 52 | 0.94(0.71-1.24) |
| Vitamin C | | | | | | | | | | | | | | | | |
| no use | 42,867 | 537,309 | 42 | 1.00 | 85 | 1.00 | 83 | 1.00 | 46 | 1.00 | 41 | 1.00 | 606 | 1.00 | 1,240 | 1.00 |
| use | 1,657 | 20,054 | 2 | 1.17(0.28-4.86) | 6 | 1.98(0.85-4.59) | 6 | 2.04(0.88-4.73) ⁺ | 3 | 1.67(0.51-5.43) | 3 | 1.79(0.55-5.84) | 30 | 1.39(0.96-2.01) ⁺ | 36 | 0.80(0.57-1.11) |
| Vitamin E | | | | | | | | | | | | | | | | |
| no use | 43,286 | 542,260 | 44 | 1.00 | 89 | 1.00 | 86 | 1.00 | 47 | 1.00 | 42 | 1.00 | 610 | 1.00 | 1,254 | 1.00 |
| use | 1,248 | 15,225 | 0 | N.A. | 2 | 0.75(0.18-3.06) | 3 | 1.21(0.38-3.87) | 2 | 1.31(0.31-5.46) | 2 | 1.49(0.35-6.23) | 26 | 1.47(0.99-2.19) ⁺ | 21 | 0.59(0.38-0.90)* |
| Liver oil | | | | | | | | | | | | | | | | |
| no use | 44,275 | 554,567 | 44 | 1.00 | 91 | 1.00 | 88 | 1.00 | 49 | 1.00 | 44 | 1.00 | 631 | 1.00 | 1,269 | 1.00 |
| use | 226 | 2,612 | 0 | NA | 0 | NA | 1 | 2.20(0.30-16.0) | 0 | NA | 0 | NA | 5 | 1.43(0.59-3.45) | 6 | 0.82(0.37-1.82) |
| Other supplement | | | | | | | | | | | | | | | | |
| no use | 42,758 | 535,475 | 44 | 1.00 | 89 | 1.00 | 87 | 1.00 | 48 | 1.00 | 43 | 1.00 | 617 | 1.00 | 1,229 | 1.00 |
| use | 1,848 | 22,663 | 0 | NA | 2 | 0.52(0.13-2.13) | 2 | 0.56(0.14-2.30) | 1 | 0.46(0.06-3.34) | 1 | 0.45(0.06-3.33) | 18 | 0.70(0.44-1.12) | 47 | 0.90(0.67-1.20) |
| Women | | | | | | | | | | | | | | | | |
| Multivitamin | | | | | | | | | | | | | | | | |
| no use | 55,366 | 721,071 | 14 | 1.00 | 37 | 1.00 | 58 | 1.00 | 44 | 1.00 | 28 | 1.00 | 394 | 1.00 | 1,017 | 1.00 |
| use | 5,616 | 67,398 | 3 | 2.58(0.71-9.38) | 3 | 1.25(0.36-4.28) | 3 | 0.51(0.16-1.66) | 3 | 0.94(0.28-3.13) | 4 | 1.82(0.60-5.54) | 38 | 1.13(0.80-1.59) | 69 | 0.77(0.60-0.99)* |
| Vitamin B1 | | | | | | | | | | | | | | | | |
| no use | 58,236 | 753,802 | 17 | 1.00 | 35 | 1.00 | 58 | 1.00 | 46 | 1.00 | 31 | 1.00 | 398 | 1.00 | 1,029 | 1.00 |
| use | 2,617 | 33,417 | 0 | NA | 4 | 1.83(0.63-5.32) | 3 | 1.11(0.34-3.61) | 1 | 0.46(0.06-3.41) | 1 | 0.66(0.09-4.92) | 34 | 1.53(1.07-2.18)* | 55 | 1.07(0.81-1.41) |
| Vitamin C | | | | | | | | | | | | | | | | |
| no use | 57,564 | 746,116 | 17 | 1.00 | 39 | 1.00 | 59 | 1.00 | 46 | 1.00 | 32 | 1.00 | 407 | 1.00 | 1,039 | 1.00 |
| use | 3,271 | 40,968 | 0 | NA | 0 | NA | 2 | 0.58(0.14-2.43) | 1 | 0.46(0.06-3.40) | 0 | NA | 25 | 1.31(0.87-1.98) | 45 | 0.97(0.72-1.32) |
| Vitamin E | | | | | | | | | | | | | | | | |
| no use | 56,607 | 733,636 | 15 | 1.00 | 38 | 1.00 | 56 | 1.00 | 46 | 1.00 | 31 | 1.00 | 410 | 1.00 | 1,041 | 1.00 |
| use | 4,276 | 53,935 | 2 | 3.33(0.73-15.3) | 1 | 0.39(0.05-2.87) | 6 | 1.45(0.61-3.46) | 1 | 0.35(0.05-2.60) | 1 | 0.48(0.06-3.64) | 22 | 0.90(0.58-1.40) | 43 | 0.75(0.55-1.02) ⁺ |
| Liver oil | | | | | | | | | | | | | | | | |
| no use | 60,303 | 780,746 | 17 | 1.00 | 39 | 1.00 | 61 | 1.00 | 46 | 1.00 | 32 | 1.00 | 429 | 1.00 | 1,076 | 1.00 |
| use | 488 | 5,909 | 0 | NA | 0 | NA | 0 | NA | 1 | 3.33(0.45-24.7) | 0 | NA | 3 | 0.96(0.31-2.99) | 7 | 0.86(0.41-1.81) |
| Other supplement | | | | | | | | | | | | | | | | |
| no use | 57,942 | 751,062 | 17 | 1.00 | 38 | 1.00 | 56 | 1.00 | 45 | 1.00 | 32 | 1.00 | 423 | 1.00 | 1,033 | 1.00 |
| use | 3,050 | 37,492 | 0 | NA | 1 | 0.62(0.08-4.54) | 5 | 1.59(0.63-4.06) | 2 | 1.05(0.25-4.42) | 0 | NA | 10 | 0.46(0.24-0.86)* | 52 | 0.99(0.75-1.32) |

[#]Adjusted for age and area of study. **p<0.01; *p<0.05; ⁺p<0.10 NA: not applicable

disease for women. The timing of supper was not associated with the risk of mortality.

Rice intake (Table 3)

The rice intake was associated with lower mortality from all causes, liver cancer, and ischemic heart disease for men and women. Similar inverse associations were observed between rice intake at age around 30 years and the risk of mortality. The exception was the positive association of rice intake at age around 30 years and mortality from lung cancer.

Miso soup (Table 3)

The intake of miso soup was associated with lower mortality from all causes for men and women and IHD for women. Interestingly, the intake of miso soup at age around 30 years was associated with lower mortality from breast and cervical cancer as well as all causes.

Preference for salty foods (Table 3)

There were no consistent associations between preference of salty foods and the risk of mortality, except for lowering with liver cancer in both sexes. A preference of salty foods tended to be associated with mortality from lung cancer and cerebrovascular disease.

Preference for fatty foods (Table 3)

There were no consistent associations between the preference of fatty foods and the risk of mortality, except for lower mortality from all causes for men and women.

Dietary modification advised by health professionals (Table 4)

Modification for salt intake was associated with higher mortality from ischemic heart disease for men and higher mortality from cerebrovascular disease for women. Modification for sugar intake was associated with higher mortality from liver and pancreas cancers for men and women and ischemic heart disease for men. Modification for total energy intake was positively associated with higher mortality from all causes and ischemic heart disease for men and women, higher mortality from colon cancer for women, and higher mortality from liver cancer for men. Modification for fat intake was associated with elevated mortality from all causes and ischemic heart disease for men, liver cancer in both genders, and pancreas cancer in women.

Meat (Table 5)

There were no consistent associations of beef, processed meat, chicken, with the risk of mortality. Pork intake was associated with lower mortality from all causes, liver cancer for both men and women. The liver intake was associated with higher mortality from cervical cancer.

Egg, milk and dairy products (Table 6)

Egg intake was associated with lower mortality from all causes for men and women, and lower mortality from cerebrovascular disease for women. The milk intake was associated with lower mortality from all causes and cerebrovascular disease, but with higher mortality from

liver cancer for men and women. The cheese intake was associated with lower mortality from all causes for men.

Butter, margarine, fried foods (Table 7)

The intake of margarine was associated with lower mortality from all causes and cerebrovascular disease for women. The intake of deep-fried foods was associated with lower mortality from all causes for men and women, lower mortality from ischemic heart disease for women and lower mortality from cerebrovascular disease for men. The intake of fried vegetables was associated with lower mortality from all causes for men and women, lower mortality from cerebrovascular disease for men.

Fresh fish and fish products (Table 8)

The intake of fresh fish was associated with lower mortality from all causes for men and women, lower mortality from prostate cancer for men, lower mortality from urothelial tract cancer, ischemic heart disease and cerebrovascular disease for women, but higher mortality from myeloid leukemia for men. The intake of fish paste products, i.e. kamaboko in Japanese, was associated with lower mortality from cerebrovascular disease for men and women. The intake of dried fish was associated with lower mortality from all causes, ischemic heart disease and cerebrovascular disease for men and women, and higher mortality from multiple myeloma for women.

Vegetables and fruits (Tables 9 and 10)

Intake of green and yellow vegetables was associated with lower mortality from all causes and cerebrovascular disease for men and women, and from lung cancer for men. Intake of sansai was associated with higher mortality from all causes for men and women. The intake of Chinese cabbage was associated with lower mortality from ischemic heart disease for men.

Fungi and potato (Table 11)

The intake of fungi tended to be associated with lower mortality from ischemic heart disease for men and women. The intake of potato was associated with lower mortality from all causes for men and women, lower mortality from ischemic heart disease only for women, but higher mortality from colon cancer for men and women.

Seaweed (Table 11)

The intake of seaweed was associated with lower mortality from all causes and lung cancer for men and women, and lower mortality for pancreatic cancer for men and for cerebrovascular disease for women.

Pickles and soy sauce-preserved foods (Table 12)

The intake of pickles was associated with lower mortality from all causes, ischemic heart disease and cerebrovascular disease. There was no association between the intake of soy sauce-preserved foods and mortality risk except for higher mortality from rectum cancer for women and lower mortality from urothelial tract cancer for men.

Boiled-beans and soy-bean paste (tofu) (Table 12)

The intake of boiled beans was associated with lower

Table 2. Age-adjusted Hazard Ratios[#] and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| | No. of subjects | Person -years | All causes | | Esophageal cancer | | Stomach cancer | | Colon cancer | | Rectal cancer | | Liver cancer | |
|-----------------------------------|-----------------|---------------|------------|------------------------------|-------------------|------------------------------|----------------|------------------------------|--------------|-------------------|---------------|-----------------|--------------|-------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | |
| not usually | 13,432 | 169,048 | 3,121 | 1.00 | 1,203 | 1.00 | 218 | 1.00 | 57 | 1.00 | 57 | 1.00 | 194 | 1.00 |
| usually | 32,044 | 398,614 | 6,961 | 0.92(0.86-0.98)** | 2,634 | 0.95(0.86-1.06) | 117 | 1.33(0.74-2.40) | 545 | 1.19(0.93-1.53) | 157 | 0.87(0.57-1.32) | 105 | 0.54(0.35-0.84)** |
| Western-style breakfast | | | | | | | | | | | | | | |
| not usually | 40,371 | 510,037 | 9,096 | 1.00 | 3,434 | 1.00 | 709 | 1.00 | 191 | 1.00 | 142 | 1.00 | 399 | 1.00 |
| usually | 5,101 | 57,589 | 985 | 0.93(0.87-1.00) [†] | 403 | 1.00(0.89-1.12) | 12 | 0.77(0.41-1.46) | 54 | 0.66(0.50-0.89)** | 23 | 0.93(0.58-1.48) | 20 | 1.40(0.85-2.30) |
| Chagayau (Tea gruel) at breakfast | | | | | | | | | | | | | | |
| not usually | 44,099 | 551,252 | 9,683 | 1.00 | 3,680 | 1.00 | 726 | 1.00 | 207 | 1.00 | 157 | 1.00 | 448 | 1.00 |
| usually | 1,373 | 16,374 | 398 | 1.05(0.93-1.18) | 157 | 1.05(0.87-1.28) | 6 | 1.04(0.38-2.87) | 37 | 1.26(0.84-1.90) | 7 | 1.15(0.45-2.89) | 5 | 0.82(0.28-2.39) |
| Other style breakfast | | | | | | | | | | | | | | |
| not usually | 44,153 | 551,695 | 9,753 | 1.00 | 3,704 | 1.00 | 740 | 1.00 | 202 | 1.00 | 156 | 1.00 | 445 | 1.00 |
| usually | 650 | 7,529 | 196 | 1.21(1.05-1.40)** | 72 | 1.23(0.97-1.55) [†] | 2 | 0.82(0.20-3.31) | 15 | 1.28(0.77-2.14) | 6 | 1.84(0.81-4.16) | 5 | 2.12(0.86-5.21) |
| Cut breakfast | | | | | | | | | | | | | | |
| No | 44,315 | 553,413 | 9,922 | 1.00 | 3,778 | 1.00 | 752 | 1.00 | 211 | 1.00 | 157 | 1.00 | 452 | 1.00 |
| Yes | 1,165 | 14,301 | 160 | 1.29(1.10-1.51)** | 59 | 1.10(0.85-1.42) | 2 | 0.81(0.20-3.31) | 11 | 1.04(0.57-1.90) | 3 | 0.93(0.30-2.93) | 5 | 2.02(0.82-5.01) |
| Supper at ordinary time | | | | | | | | | | | | | | |
| Yes | 14,181 | 185,467 | 3,040 | 1.00 | 1,171 | 1.00 | 215 | 1.00 | 54 | 1.00 | 54 | 1.00 | 203 | 1.00 |
| No | 30,896 | 377,626 | 6,888 | 0.94(0.86-1.02) | 2,626 | 1.03(0.89-1.18) | 111 | 1.06(0.55-2.07) | 533 | 1.31(0.93-1.85) | 157 | 1.02(0.59-1.76) | 109 | 0.75(0.43-1.32) |
| Women | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | |
| not usually | 19,785 | 254,797 | 2,324 | 1.00 | 717 | 1.00 | 115 | 1.00 | 55 | 1.00 | 24 | 1.00 | 75 | 1.00 |
| usually | 42,793 | 551,289 | 4,726 | 0.97(0.90-1.05) | 1,565 | 1.10(0.96-1.26) | 19 | 1.54(0.46-5.15) | 258 | 1.23(0.87-1.73) | 162 | 1.06(0.69-1.62) | 64 | 1.21(0.56-2.64) |
| Western-style breakfast | | | | | | | | | | | | | | |
| not usually | 52,090 | 684,848 | 6,238 | 1.00 | 1,978 | 1.00 | 327 | 1.00 | 186 | 1.00 | 75 | 1.00 | 192 | 1.00 |
| usually | 10,482 | 121,156 | 813 | 0.83(0.77-0.90)** | 304 | 0.93(0.82-1.07) | 4 | 1.07(0.33-3.46) | 46 | 0.88(0.63-1.24) | 31 | 1.01(0.67-1.54) | 13 | 1.47(0.77-2.80) |
| Chagayau (Tea gruel) at breakfast | | | | | | | | | | | | | | |
| not usually | 60,691 | 782,216 | 6,733 | 1.00 | 2,205 | 1.00 | 364 | 1.00 | 211 | 1.00 | 87 | 1.00 | 218 | 1.00 |
| usually | 1,883 | 23,814 | 318 | 1.16(1.01-1.34)* | 77 | 0.89(0.67-1.17) | 2 | 0.40(0.07-2.27) | 9 | 0.41(0.19-0.88)* | 6 | 0.68(0.26-1.76) | 1 | 0.42(0.05-3.77) |
| Other style breakfast | | | | | | | | | | | | | | |
| not usually | 60,726 | 782,806 | 6,863 | 1.00 | 2,221 | 1.00 | 365 | 1.00 | 209 | 1.00 | 84 | 1.00 | 217 | 1.00 |
| usually | 802 | 9,633 | 117 | 1.27(1.06-1.53)** | 27 | 0.93(0.63-1.36) | 1 | 2.53(0.34-18.9) | 5 | 1.03(0.43-2.50) | 2 | 0.62(0.15-2.49) | 1 | 0.92(0.13-6.62) |
| Cut breakfast | | | | | | | | | | | | | | |
| No | 61,419 | 791,308 | 6,970 | 1.00 | 2,256 | 1.00 | 370 | 1.00 | 216 | 1.00 | 87 | 1.00 | 222 | 1.00 |
| Yes | 1,164 | 14,833 | 81 | 1.25(1.00-1.56)* | 26 | 0.99(0.67-1.46) | 0 | NA | 3 | 0.79(0.25-2.46) | 1 | 0.41(0.06-2.94) | 1 | 0.94(0.13-6.80) |
| Supper at ordinary time | | | | | | | | | | | | | | |
| Yes | 16,434 | 224,391 | 2,064 | 1.00 | 655 | 1.00 | 105 | 1.00 | 50 | 1.00 | 28 | 1.00 | 79 | 1.00 |
| No | 45,518 | 573,916 | 4,818 | 0.91(0.82-1.02) | 1,585 | 0.96(0.79-1.17) | 18 | 0.31(0.09-1.05) [†] | 265 | 1.14(0.68-1.92) | 160 | 0.71(0.41-1.23) | 59 | 0.68(0.29-1.58) |

[#]Adjusted for age and area of study. ** p<0.01; * p<0.05; [†]p<0.10 NA: not applicable

Table 2. Continued. Age-adjusted Hazard Ratios^a and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| | No. of subjects | Person -years | Gall bladder cancer | | Pancreas cancer | | Lung cancer | | Breast cancer | | Uterine cervix cancer | | Prostate cancer | |
|----------------------------------|-----------------|---------------|---------------------|-------------------------------|-----------------|------------------------------|-------------|-----------------|---------------|-----------------|-----------------------|-----------------|-----------------|-----------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | |
| not usually | 13,432 | 169,048 | 26 | 1.00 | 71 | 1.00 | 272 | 1.00 | NA | NA | NA | NA | 51 | 1.00 |
| usually | 32,044 | 398,614 | 45 | 0.55(0.28-1.08) ⁺ | 149 | 0.84(0.55-1.26) | 623 | 0.92(0.75-1.14) | NA | NA | NA | NA | 118 | 1.09(0.65-1.84) |
| Western-style breakfast | | | | | | | | | | | | | | |
| not usually | 40,371 | 510,037 | 65 | 1.00 | 190 | 1.00 | 801 | 1.00 | NA | NA | NA | NA | 149 | 1.00 |
| usually | 5,101 | 57,589 | 6 | 0.88(0.36-2.17) | 30 | 1.48(0.97-2.25) ⁺ | 94 | 0.96(0.76-1.21) | NA | NA | NA | NA | 20 | 1.10(0.66-1.83) |
| Chagayu (Tea gruel) at breakfast | | | | | | | | | | | | | | |
| not usually | 44,099 | 551,252 | 67 | 1.00 | 207 | 1.00 | 854 | 1.00 | NA | NA | NA | NA | 163 | 1.00 |
| usually | 1,373 | 16,374 | 4 | 1.96(0.51-7.45) | 13 | 1.29(0.63-2.64) | 41 | 1.02(0.70-1.49) | NA | NA | NA | NA | 6 | 1.17(0.43-3.18) |
| Other style breakfast | | | | | | | | | | | | | | |
| not usually | 44,153 | 551,695 | 68 | 1.00 | 210 | 1.00 | 857 | 1.00 | NA | NA | NA | NA | 168 | 1.00 |
| usually | 650 | 7,529 | 2 | 1.88(0.45-7.78) | 5 | 1.49(0.61-3.63) | 18 | 1.26(0.79-2.02) | NA | NA | NA | NA | 0 | NA |
| Cut of breakfast | | | | | | | | | | | | | | |
| No | 44,315 | 553,413 | 70 | 1.00 | 215 | 1.00 | 881 | 1.00 | NA | NA | NA | NA | 168 | 1.00 |
| Yes | 1,165 | 14,301 | 1 | N.A | 5 | 1.64(0.67-4.02) | 14 | 1.11(0.65-1.89) | NA | NA | NA | NA | 1 | 0.62(0.09-4.43) |
| Supper at ordinary time | | | | | | | | | | | | | | |
| Yes | 14,181 | 185,467 | 20 | 1.00 | 69 | 1.00 | 260 | 1.00 | NA | NA | NA | NA | 51 | 1.00 |
| No | 30,896 | 377,626 | 48 | 1.09(0.33-3.57) | 146 | 0.92(0.52-1.61) | 630 | 0.95(0.72-1.27) | NA | NA | NA | NA | 117 | 1.52(0.61-3.74) |
| Women | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | |
| not usually | 19,785 | 254,797 | 36 | 1.00 | 58 | 1.00 | 89 | 1.00 | 34 | 1.00 | 12 | 1.00 | NA | NA |
| usually | 42,793 | 551,289 | 58 | 0.60(0.34-1.04) ⁺ | 159 | 1.25(0.80-1.95) | 172 | 1.13(0.77-1.67) | 68 | 1.14(0.59-2.17) | 23 | 1.21(0.43-3.38) | NA | NA |
| Western-style breakfast | | | | | | | | | | | | | | |
| not usually | 52,090 | 684,848 | 79 | 1.00 | 185 | 1.00 | 224 | 1.00 | 88 | 1.00 | 30 | 1.00 | NA | NA |
| usually | 10,482 | 121,156 | 15 | 1.06(0.57-1.97) | 32 | 1.08(0.72-1.64) | 37 | 0.84(0.57-1.24) | 14 | 0.97(0.52-1.81) | 5 | 0.81(0.29-2.28) | NA | NA |
| Chagayu (Tea gruel) at breakfast | | | | | | | | | | | | | | |
| not usually | 60,691 | 782,216 | 90 | 1.00 | 207 | 1.00 | 251 | 1.00 | 100 | 1.00 | 34 | 1.00 | NA | NA |
| usually | 1,883 | 23,814 | 4 | 1.24(0.35-4.43) | 10 | 1.22(0.54-2.74) | 10 | 1.01(0.46-2.20) | 2 | 1.10(0.25-4.92) | 1 | 0.42(0.05-3.69) | NA | NA |
| Other style breakfast | | | | | | | | | | | | | | |
| not usually | 60,726 | 782,806 | 91 | 1.00 | 211 | 1.00 | 258 | 1.00 | 99 | 1.00 | 34 | 1.00 | NA | NA |
| usually | 802 | 9,633 | 1 | 0.84(0.12-6.07) | 4 | 1.39(0.52-3.76) | 1 | 0.28(0.04-2.01) | 0 | NA | 1 | 2.31(0.31-17.1) | NA | NA |
| Cut of breakfast | | | | | | | | | | | | | | |
| No | 61,419 | 791,308 | 89 | 1.00 | 217 | 1.00 | 257 | 1.00 | 101 | 1.00 | 35 | 1.00 | NA | NA |
| Yes | 1,164 | 14,833 | 5 | 4.66(1.86-11.7) ^{**} | 0 | NA | 4 | 1.36(0.50-3.67) | 1 | 0.50(0.07-3.62) | 0 | NA | NA | NA |
| Supper at ordinary time | | | | | | | | | | | | | | |
| Yes | 16,434 | 224,391 | 23 | 1.00 | 52 | 1.00 | 78 | 1.00 | 35 | 1.00 | 10 | 1.00 | NA | NA |
| No | 45,518 | 573,916 | 70 | 1.62(0.51-5.18) | 155 | 1.28(0.62-2.60) | 175 | 0.80(0.47-1.36) | 67 | 1.01(0.44-2.35) | 25 | 0.99(0.23-4.22) | NA | NA |

^aAdjusted for age and area of study. ^{**} p<0.01; ^{*} p<0.05; ⁺p<0.10 NA: not applicable

Table 2. Continued.. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| Men | No. of subjects | Person -years | Kidney cancer | | Urothelial tract cancer | | Non-Hodgkin's | | Multiple myeloma | | Myeloid leukemia | | Ischemic heart disease | | Cerebrovascular | |
|----------------------------------|-----------------|---------------|---------------|-----------------|-------------------------|------------------|---------------|------------------|------------------|------------------------------|------------------|------------------------------|------------------------|------------------|-----------------|------------------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | | | |
| not usually | 13,432 | 169,048 | 14 | 1.00 | 28 | 1.00 | 34 | 1.00 | 13 | 1.00 | 18 | 1.00 | 203 | 1.00 | 359 | 1.00 |
| usually | 32,044 | 398,614 | 31 | 1.43(0.53-3.85) | 64 | 1.58(0.73-3.40) | 59 | 0.78(0.40-1.49) | 36 | 6.27(0.84-47.0) ⁺ | 25 | 0.38(0.18-0.80)* | 451 | 0.95(0.74-1.22) | 943 | 0.96(0.80-1.16) |
| Western-style breakfast | | | | | | | | | | | | | | | | |
| not usually | 40,371 | 510,037 | 40 | 1.00 | 81 | 1.00 | 78 | 1.00 | 46 | 1.00 | 34 | 1.00 | 599 | 1.00 | 1185 | 1.00 |
| usually | 5,101 | 57,589 | 5 | 0.82(0.30-2.25) | 11 | 1.04(0.52-2.08) | 15 | 1.93(1.05-3.55)* | 3 | 0.67(0.20-2.25) | 9 | 2.22(0.99-5.00) ⁺ | 55 | 0.73(0.55-0.99)* | 116 | 0.89(0.72-1.09) |
| Chagayu (Tea gruel) at breakfast | | | | | | | | | | | | | | | | |
| not usually | 44,099 | 551,252 | 41 | 1.00 | 90 | 1.00 | 92 | 1.00 | 48 | 1.00 | 41 | 1.00 | 629 | 1.00 | 1251 | 1.00 |
| usually | 1,373 | 16,374 | 4 | 1.60(0.46-5.53) | 2 | 0.43(0.09-1.99) | 1 | 0.26(0.03-2.13) | 1 | 0.38(0.04-3.59) | 2 | 1.28(0.25-6.62) | 25 | 0.99(0.62-1.60) | 50 | 1.16(0.82-1.64) |
| Other style breakfast | | | | | | | | | | | | | | | | |
| not usually | 44,153 | 551,695 | 43 | 1.00 | 89 | 1.00 | 90 | 1.00 | 48 | 1.00 | 43 | 1.00 | 632 | 1.00 | 1257 | 1.00 |
| usually | 650 | 7,529 | 1 | 1.31(0.18-9.58) | 2 | 1.33(0.32-5.44) | 2 | 1.44(0.35-5.90) | 0 | NA | 0 | NA | 15 | 1.41(0.84-2.37) | 27 | 1.20(0.82-1.76) |
| Cut breakfast | | | | | | | | | | | | | | | | |
| No | 44,315 | 553,413 | 45 | 1.00 | 92 | 1.00 | 92 | 1.00 | 48 | 1.00 | 41 | 1.00 | 639 | 1.00 | 1286 | 1.00 |
| Yes | 1,165 | 14,301 | 0 | NA | 0 | NA | 1 | 0.83(0.11-6.01) | 1 | 1.58(0.21-11.7) | 2 | 2.48(0.58-10.6) | 15 | 1.90(1.13-3.19)* | 16 | 1.14(0.70-1.88) |
| Supper at ordinary time | | | | | | | | | | | | | | | | |
| Yes | 14,181 | 185,467 | 15 | 1.00 | 27 | 1.00 | 29 | 1.00 | 14 | 1.00 | 10 | 1.00 | 196 | 1.00 | 373 | 1.00 |
| No | 30,896 | 377,626 | 30 | 0.55(0.20-1.47) | 65 | 2.43(0.59-10.1) | 62 | 0.94(0.40-2.23) | 34 | 1.65(0.39-7.08) | 32 | 1.43(0.42-4.85) | 449 | 1.11(0.77-1.59) | 906 | 0.89(0.70-1.14) |
| Women | | | | | | | | | | | | | | | | |
| Japanese-style breakfast | | | | | | | | | | | | | | | | |
| not usually | 19,785 | 254,797 | 4 | 1.00 | 16 | 1.00 | 18 | 1.00 | 17 | 1.00 | 6 | 1.00 | 162 | 1.00 | 327 | 1.00 |
| usually | 42,793 | 551,289 | 14 | 0.65(0.18-2.35) | 24 | 1.28(0.37-4.49) | 47 | 1.10(0.53-2.30) | 31 | 1.51(0.50-4.56) | 27 | 6.28(0.82-48.2) ⁺ | 286 | 0.84(0.63-1.11) | 804 | 0.99(0.82-1.19) |
| Western-style breakfast | | | | | | | | | | | | | | | | |
| not usually | 52,090 | 684,848 | 15 | 1.00 | 38 | 1.00 | 54 | 1.00 | 45 | 1.00 | 32 | 1.00 | 387 | 1.00 | 1031 | 1.00 |
| usually | 10,482 | 121,156 | 3 | 1.50(0.42-5.36) | 2 | 0.43(0.09-1.95) | 11 | 0.97(0.47-2.02) | 3 | 0.44(0.13-1.56) | 1 | 0.13(0.02-1.02) ⁺ | 61 | 0.99(0.73-1.33) | 101 | 0.61(0.49-0.76)** |
| Chagayu (Tea gruel) at breakfast | | | | | | | | | | | | | | | | |
| not usually | 60,691 | 782,216 | 17 | 1.00 | 40 | 1.00 | 63 | 1.00 | 47 | 1.00 | 32 | 1.00 | 411 | 1.00 | 1082 | 1.00 |
| usually | 1,883 | 23,814 | 1 | 2.63(0.25-27.8) | 0 | NA | 2 | 0.98(0.20-4.86) | 1 | 0.66(0.07-6.57) | 1 | 3.79(0.41-35.0) | 37 | 1.80(1.15-2.81)* | 50 | 1.18(0.82-1.68) |
| Other style breakfast | | | | | | | | | | | | | | | | |
| not usually | 60,726 | 782,806 | 18 | 1.00 | 39 | 1.00 | 62 | 1.00 | 47 | 1.00 | 33 | 1.00 | 431 | 1.00 | 1107 | 1.00 |
| usually | 802 | 9,633 | 0 | NA | 1 | 2.74(0.37-20.4) | 0 | NA | 1 | 1.88(0.26-13.8) | 0 | NA | 8 | 1.32(0.66-2.67) | 18 | 1.16(0.73-1.85) |
| Cut breakfast | | | | | | | | | | | | | | | | |
| No | 61,419 | 791,308 | 18 | 1.00 | 39 | 1.00 | 64 | 1.00 | 47 | 1.00 | 33 | 1.00 | 446 | 1.00 | 1117 | 1.00 |
| Yes | 1,164 | 14,833 | 0 | NA | 1 | 3.15(0.42-23.4) | 1 | 1.10(0.15-8.0) | 1 | 2.02(0.27-15.0) | 0 | NA | 2 | 0.60(0.15-2.39) | 15 | 1.54(0.92-2.57) ⁺ |
| Supper at ordinary time | | | | | | | | | | | | | | | | |
| Yes | 16,434 | 224,391 | 1 | 1.00 | 19 | 1.00 | 14 | 1.00 | 18 | 1.00 | 8 | 1.00 | 138 | 1.00 | 290 | 1.00 |
| No | 45,518 | 573,916 | 16 | NA | 21 | 0.32(0.11-0.94)* | 50 | 0.89(0.32-2.49) | 29 | 1.01(0.24-4.26) | 25 | 1.75(0.24-13.0) | 301 | 0.75(0.49-1.15) | 806 | 0.91(0.69-1.21) |

*Adjusted for age and area of study. ** p<0.01; * p<0.05; ⁺ p<0.10 NA: not applicable

Table 3. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| | No. of subjects | Person -years | All causes | | All cancers | | Esophageal cancer | | Stomach cancer | | Colon cancer | | Rectal cancer | | Liver cancer | |
|--------------------------------------|-----------------|---------------|------------|------------------------------|-------------|------------------------------|-------------------|-------------------|----------------|------------------------------|--------------|------------------------------|---------------|------------------------------|--------------|------------------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | | | |
| <3/day | 11,522 | 139,125 | 2,790 | 1.00 | 1,006 | 1.00 | 40 | 1.00 | 201 | 1.00 | 60 | 1.00 | 44 | 1.00 | 146 | 1.00 |
| 3-4/day | 20,352 | 252,803 | 4,828 | 0.92(0.88-0.97)** | 1,842 | 0.99(0.91-1.07) | 67 | 0.84(0.57-1.26) | 341 | 0.92(0.77-1.10) | 108 | 0.95(0.69-1.31) | 80 | 0.93(0.64-1.35) | 228 | 0.91(0.73-1.12) |
| ≥5/day | 12,829 | 166,800 | 2,156 | 0.78(0.73-0.83)** | 912 | 0.87(0.80-0.96)** | 41 | 0.81(0.51-1.27) | 200 | 0.98(0.80-1.21) | 43 | 0.69(0.46-1.04) ⁺ | 36 | 0.68(0.43-1.08) | 77 | 0.57(0.43-0.77)** |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | | | |
| <4/day | 15,465 | 198,365 | 3,423 | 1.00 | 1,295 | 1.00 | 45 | 1.00 | 254 | 1.00 | 78 | 1.00 | 54 | 1.00 | 209 | 1.00 |
| 4-6/day | 19,213 | 238,275 | 3,926 | 0.92(0.87-0.97)** | 1,530 | 0.99(0.91-1.08) | 63 | 1.16(0.73-1.84) | 317 | 1.06(0.87-1.30) | 92 | 0.89(0.63-1.26) | 68 | 1.12(0.72-1.73) | 168 | 0.88(0.68-1.13) |
| ≥7/day | 7,613 | 92,774 | 1,895 | 0.86(0.81-0.92)** | 730 | 0.93(0.84-1.04) | 32 | 1.23(0.72-2.11) | 131 | 0.87(0.68-1.12) | 34 | 0.70(0.45-1.10) | 25 | 0.82(0.47-1.44) | 51 | 0.60(0.42-0.85)** |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 2,036 | 1.00 | 809 | 1.00 | 25 | 1.00 | 147 | 1.00 | 49 | 1.00 | 41 | 1.00 | 105 | 1.00 |
| 1/day | 20,026 | 252,317 | 4,503 | 0.95(0.89-1.01) | 1,707 | 1.02(0.92-1.12) | 76 | 1.18(0.68-2.02) | 359 | 1.19(0.94-1.49) | 94 | 0.79(0.52-1.19) | 67 | 0.72(0.45-1.16) | 154 | 0.93(0.69-1.26) |
| ≥2/day | 12,073 | 151,636 | 2,913 | 0.95(0.89-1.01) ⁺ | 1,103 | 0.96(0.87-1.05) | 46 | 1.40(0.84-2.35) | 208 | 0.96(0.77-1.20) | 63 | 0.87(0.58-1.28) | 46 | 0.75(0.48-1.18) | 172 | 1.07(0.83-1.38) |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 2,036 | 1.00 | 809 | 1.00 | 25 | 1.00 | 147 | 1.00 | 49 | 1.00 | 41 | 1.00 | 105 | 1.00 |
| 1/day | 13,347 | 166,981 | 3,358 | 0.93(0.87-1.00)* | 1,233 | 0.97(0.87-1.08) | 53 | 1.05(0.59-1.86) | 260 | 1.12(0.88-1.43) | 74 | 0.88(0.57-1.36) | 42 | 0.56(0.33-0.95)* | 98 | 0.80(0.57-1.11) |
| ≥2/day | 18,752 | 236,972 | 4,058 | 0.95(0.90-1.01) | 1,577 | 0.99(0.90-1.08) | 69 | 1.39(0.86-2.26) | 307 | 1.04(0.84-1.28) | 83 | 0.81(0.56-1.17) | 71 | 0.81(0.54-1.23) | 228 | 1.08(0.84-1.37) |
| Preference for salty foods | | | | | | | | | | | | | | | | |
| dislike | 4,615 | 55,363 | 1,043 | 1.00 | 361 | 1.00 | 11 | 1.00 | 75 | 1.00 | 22 | 1.00 | 15 | 1.00 | 54 | 1.00 |
| so-so | 15,663 | 194,035 | 2,972 | 1.06(0.99-1.14) ⁺ | 1,195 | 1.20(1.07-1.36)** | 67 | 2.07(1.09-3.93)** | 227 | 1.07(0.82-1.39) | 57 | 0.90(0.55-1.48) | 54 | 1.28(0.72-2.28) | 119 | 0.72(0.52-1.00)* |
| like | 17,071 | 209,333 | 3,652 | 1.00(0.93-1.07) | 1,364 | 1.08(0.96-1.21) | 36 | 0.89(0.45-1.76) | 277 | 1.03(0.79-1.33) | 92 | 1.15(0.72-1.83) | 57 | 1.08(0.61-1.92) | 118 | 0.60(0.43-0.83)** |
| Preference for fatty foods | | | | | | | | | | | | | | | | |
| dislike | 8,277 | 99,314 | 1,872 | 1.00 | 680 | 1.00 | 32 | 1.00 | 147 | 1.00 | 35 | 1.00 | 19 | 1.00 | 85 | 1.00 |
| so-so | 11,249 | 139,775 | 2,118 | 0.91(0.85-0.97)** | 839 | 0.99(0.89-1.10) | 33 | 0.80(0.49-1.31) | 162 | 0.86(0.69-1.08) | 44 | 0.95(0.61-1.49) | 36 | 1.46(0.83-2.55) | 70 | 0.63(0.46-0.87)** |
| like | 18,039 | 221,832 | 3,768 | 0.91(0.86-0.96)** | 1,441 | 0.97(0.88-1.06) | 56 | 0.76(0.49-1.17) | 274 | 0.83(0.68-1.02) ⁺ | 90 | 1.12(0.76-1.66) | 68 | 1.61(0.96-2.68) ⁺ | 143 | 0.77(0.59-1.01) ⁺ |
| Women | | | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | | | |
| <3/day | 20,090 | 252,157 | 2,227 | 1.00 | 714 | 1.00 | 6 | 1.00 | 123 | 1.00 | 69 | 1.00 | 25 | 1.00 | 83 | 1.00 |
| 3/day | 29,479 | 382,537 | 3,512 | 0.94(0.89-0.99)* | 1,110 | 0.95(0.86-1.05) | 12 | 1.16(0.42-3.15) | 179 | 0.88(0.70-1.12) | 102 | 0.85(0.62-1.16) | 37 | 0.81(0.48-1.35) | 114 | 0.86(0.64-1.15) |
| ≥4/day | 11,922 | 157,465 | 1,057 | 0.95(0.88-1.03) | 396 | 1.04(0.91-1.18) | 8 | 2.00(0.65-6.18) | 64 | 0.96(0.70-1.33) | 35 | 0.98(0.64-1.50) | 25 | 1.81(1.01-3.24)* | 21 | 0.50(0.31-0.82)** |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | | | |
| <4/day | 27,372 | 361,142 | 2,916 | 1.00 | 973 | 1.00 | 8 | 1.00 | 155 | 1.00 | 76 | 1.00 | 44 | 1.00 | 118 | 1.00 |
| 4-5/day | 13,267 | 169,135 | 1,159 | 0.89(0.83-0.96)** | 398 | 0.88(0.77-0.99)* | 4 | 0.75(0.22-2.58) | 69 | 0.99(0.72-1.34) | 37 | 0.94(0.62-1.43) | 21 | 1.00(0.57-1.76) | 35 | 0.67(0.45-1.00)* |
| ≥6/day | 17,003 | 213,840 | 2,224 | 0.88(0.83-0.94)** | 726 | 0.94(0.85-1.05) | 12 | 1.13(0.43-2.96) | 121 | 0.96(0.73-1.26) | 87 | 1.25(0.88-1.76) | 19 | 0.53(0.29-0.97)* | 51 | 0.59(0.41-0.86)** |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 1,690 | 1.00 | 579 | 1.00 | 4 | 1.00 | 87 | 1.00 | 55 | 1.00 | 19 | 1.00 | 56 | 1.00 |
| 1/day | 21,927 | 288,464 | 2,550 | 0.91(0.85-0.98)* | 819 | 0.92(0.81-1.04) | 15 | 4.59(1.30-16.3)* | 141 | 1.14(0.82-1.58) | 83 | 0.71(0.47-1.07) | 36 | 0.80(0.41-1.56) | 73 | 0.85(0.55-1.31) |
| ≥2/day | 19,074 | 248,469 | 2,356 | 0.99(0.93-1.06) | 758 | 0.97(0.87-1.09) | 7 | 2.34(0.66-8.34) | 134 | 1.18(0.89-1.58) | 63 | 0.84(0.58-1.23) | 31 | 1.02(0.56-1.85) | 81 | 0.99(0.69-1.42) |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 1,690 | 1.00 | 579 | 1.00 | 4 | 1.00 | 87 | 1.00 | 55 | 1.00 | 19 | 1.00 | 56 | 1.00 |
| 1/day | 14,023 | 184,857 | 1,897 | 0.91(0.84-0.98)* | 594 | 0.93(0.81-1.07) | 14 | 7.44(2.02-27.5)** | 1081 | 1.24(0.88-1.76) | 61 | 0.69(0.44-1.07) ⁺ | 29 | 0.92(0.46-1.84) | 56 | 0.91(0.58-1.45) |
| ≥2/day | 26,978 | 352,076 | 3,009 | 0.98(0.92-1.04) | 983 | 0.96(0.86-1.07) | 8 | 2.13(0.61-7.35) | 167 | 1.15(0.87-1.51) | 85 | 0.82(0.57-1.18) | 38 | 0.93(0.52-1.66) | 98 | 0.95(0.67-1.35) |
| Preference for salty foods | | | | | | | | | | | | | | | | |
| dislike | 9,590 | 119,607 | 1,047 | 1.00 | 333 | 1.00 | 6 | 1.00 | 51 | 1.00 | 28 | 1.00 | 11 | 1.00 | 40 | 1.00 |
| so-so | 13,586 | 169,899 | 1,438 | 1.05(0.97-1.14) | 472 | 1.08(0.94-1.25) | 7 | 0.87(0.29-2.63) | 67 | 1.02(0.71-1.48) | 55 | 1.50(0.95-2.38) ⁺ | 20 | 1.20(0.57-2.52) | 36 | 0.68(0.43-1.08) |
| like | 28,107 | 356,657 | 2,730 | 0.93(0.87-1.00)* | 908 | 0.96(0.84-1.09) | 8 | 0.48(0.16-1.40) | 157 | 1.11(0.80-1.52) | 89 | 1.12(0.73-1.71) | 32 | 0.89(0.45-1.78) | 71 | 0.61(0.41-0.91)* |
| Preference for fatty foods | | | | | | | | | | | | | | | | |
| dislike | 17,425 | 215,448 | 2,085 | 1.00 | 636 | 1.00 | 7 | 1.00 | 107 | 1.00 | 61 | 1.00 | 28 | 1.00 | 65 | 1.00 |
| so-so | 7,622 | 96,260 | 715 | 1.04(0.95-1.13) | 262 | 1.15(1.00-1.33) ⁺ | 3 | 1.47(0.38-5.76) | 38 | 1.04(0.72-1.52) | 31 | 1.52(0.98-2.35) ⁺ | 12 | 1.09(0.55-2.17) | 19 | 0.83(0.50-1.40) |
| like | 26,917 | 342,106 | 2,553 | 0.92(0.86-0.97)** | 866 | 0.97(0.87-1.07) | 12 | 1.38(0.54-3.55) | 144 | 0.98(0.76-1.26) | 79 | 0.93(0.67-1.31) | 24 | 0.55(0.32-0.95)* | 65 | 0.71(0.50-1.00)* |

#Adjusted for age and area of study. ** p<0.01; * p<0.05; ⁺p<0.10

Table 3. Continued. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| | No. of subjects | Person -years | Gall bladder cancer | | Pancreas cancer | | Lung cancer | | Breast cancer | | Uterine cervix cancer | | Prostate cancer | |
|---|-----------------|---------------|---------------------|-------------------|-----------------|-------------------|-------------|-------------------|---------------|------------------|-----------------------|------------------|-----------------|-----------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | |
| <3/day | 11,522 | 139,125 | 21 | 1.00 | 56 | 1.00 | 212 | 1.00 | NA | NA | NA | NA | 46 | 1.00 |
| 3-4/day | 20,352 | 252,803 | 41 | 1.00(0.58-1.70) | 110 | 1.04(0.75-1.45) | 418 | 1.06(0.90-1.26) | NA | NA | NA | NA | 87 | 1.07(0.74-1.54) |
| ≥5/day | 12,829 | 166,800 | 8 | 0.36(0.16-0.84)* | 49 | 0.82(0.55-1.22) | 249 | 1.10(0.91-1.34) | NA | NA | NA | NA | 31 | 0.92(0.57-1.49) |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | |
| <4/day | 15,465 | 198,365 | 28 | 1.00 | 71 | 1.00 | 255 | 1.00 | NA | NA | NA | NA | 56 | 1.00 |
| 4-6/day | 19,213 | 238,275 | 28 | 0.79(0.43-1.45) | 83 | 0.87(0.60-1.24) | 350 | 1.08(0.89-1.30) | NA | NA | NA | NA | 65 | 1.08(0.70-1.67) |
| ≥7/day | 7,613 | 92,774 | 12 | 0.62(0.29-1.32) | 48 | 0.95(0.63-1.45) | 221 | 1.27(1.03-1.57)* | NA | NA | NA | NA | 31 | 1.01(0.60-1.69) |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 10 | 1.00 | 56 | 1.00 | 181 | 1.00 | NA | NA | NA | NA | 32 | 1.00 |
| 1/day | 20,026 | 252,317 | 31 | 1.21(0.53-2.79) | 102 | 0.77(0.51-1.15) | 408 | 1.09(0.88-1.34) | NA | NA | NA | NA | 76 | 0.97(0.59-1.59) |
| ≥2/day | 12,073 | 151,636 | 25 | 1.57(0.73-3.38) | 44 | 0.55(0.36-0.84)** | 248 | 1.05(0.85-1.28) | NA | NA | NA | NA | 53 | 0.95(0.59-1.51) |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 10 | 1.00 | 56 | 1.00 | 181 | 1.00 | NA | NA | NA | NA | 32 | 1.00 |
| 1/day | 13,347 | 166,981 | 25 | 1.36(0.57-3.25) | 76 | 0.74(0.48-1.13) | 297 | 1.05(0.84-1.32) | NA | NA | NA | NA | 60 | 0.99(0.59-1.66) |
| ≥2/day | 18,752 | 236,972 | 31 | 1.43(0.68-3.02) | 70 | 0.62(0.42-0.90)* | 359 | 1.07(0.89-1.30) | NA | NA | NA | NA | 69 | 0.94(0.60-1.47) |
| Preference for salty foods | | | | | | | | | | | | | | |
| dislike | 4,615 | 55,363 | 6 | 1.00 | 23 | 1.00 | 73 | 1.00 | NA | NA | NA | NA | 17 | 1.00 |
| so-so | 15,663 | 194,035 | 19 | 1.35(0.53-3.41) | 70 | 1.15(0.71-1.85) | 298 | 1.57(1.22-2.04)** | NA | NA | NA | NA | 45 | 1.09(0.62-1.92) |
| like | 17,071 | 209,333 | 31 | 1.54(0.64-3.70) | 75 | 0.96(0.60-1.54) | 336 | 1.36(1.06-1.76)* | NA | NA | NA | NA | 62 | 1.05(0.61-1.80) |
| Preference for fatty foods | | | | | | | | | | | | | | |
| dislike | 8,277 | 99,314 | 10 | 1.00 | 45 | 1.00 | 148 | 1.00 | NA | NA | NA | NA | 31 | 1.00 |
| so-so | 11,249 | 139,775 | 10 | 0.83(0.34-2.01) | 47 | 0.85(0.56-1.28) | 224 | 1.29(1.04-1.59)* | NA | NA | NA | NA | 35 | 0.88(0.54-1.43) |
| like | 18,039 | 221,832 | 37 | 1.66(0.82-3.35) | 81 | 0.84(0.58-1.21) | 343 | 1.09(0.90-1.32) | NA | NA | NA | NA | 61 | 0.86(0.56-1.33) |
| Women | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | |
| <3/day | 20,090 | 252,157 | 35 | 1.00 | 66 | 1.00 | 72 | 1.00 | 32 | 1.00 | 9 | 1.00 | NA | NA |
| 3/day | 29,479 | 382,537 | 43 | 0.77(0.49-1.23) | 107 | 0.97(0.71-1.33) | 136 | 1.24(0.92-1.66) | 48 | 0.99(0.62-1.56) | 17 | 1.27(0.56-2.90) | NA | NA |
| ≥4/day | 11,922 | 157,465 | 13 | 0.65(0.33-1.29) | 33 | 0.98(0.63-1.52) | 51 | 1.40(0.95-2.04)* | 18 | 0.95(0.52-1.73) | 8 | 1.40(0.52-3.81) | NA | NA |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | |
| ≤3/day | 27,372 | 361,142 | 43 | 1.00 | 81 | 1.00 | 101 | 1.00 | 53 | 1.00 | 17 | 1.00 | NA | NA |
| 4-5/day | 13,267 | 169,135 | 8 | 0.35(0.16-0.77)** | 41 | 0.97(0.66-1.44) | 43 | 1.02(0.69-1.51) | 19 | 0.85(0.49-1.49) | 7 | 0.90(0.35-2.30) | NA | NA |
| ≥6/day | 17,003 | 213,840 | 33 | 0.85(0.51-1.42) | 76 | 1.04(0.74-1.47) | 96 | 1.37(0.98-1.91)* | 19 | 0.70(0.39-1.27) | 7 | 0.63(0.24-1.67) | NA | NA |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 22 | 1.00 | 48 | 1.00 | 73 | 1.00 | 30 | 1.00 | 13 | 1.00 | NA | NA |
| 1/day | 21,927 | 288,464 | 30 | 1.02(0.54-1.94) | 85 | 1.12(0.74-1.70) | 83 | 0.82(0.56-1.20) | 35 | 0.76(0.42-1.36) | 10 | 0.66(0.24-1.78) | NA | NA |
| ≥2/day | 19,074 | 248,469 | 36 | 1.36(0.78-2.38) | 65 | 1.04(0.70-1.53) | 90 | 0.93(0.67-1.30) | 30 | 0.77(0.45-1.32) | 10 | 0.65(0.27-1.55) | NA | NA |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 22 | 1.00 | 48 | 1.00 | 73 | 1.00 | 30 | 1.00 | 13 | 1.00 | NA | NA |
| 1/day | 14,023 | 184,857 | 20 | 0.98(0.49-2.00) | 62 | 1.15(0.74-1.79) | 61 | 0.88(0.58-1.34) | 14 | 0.39(0.19-0.80)* | 4 | 0.34(0.09-1.23)* | NA | NA |
| ≥2/day | 26,978 | 352,076 | 46 | 1.30(0.76-2.23) | 88 | 1.05(0.72-1.52) | 112 | 0.90(0.66-1.23) | 51 | 0.88(0.55-1.43) | 16 | 0.75(0.34-1.63) | NA | NA |
| Preference for salty foods | | | | | | | | | | | | | | |
| dislike | 9,590 | 119,607 | 13 | 1.00 | 34 | 1.00 | 34 | 1.00 | 13 | 1.00 | 2 | 1.00 | NA | NA |
| so-so | 13,586 | 169,899 | 30 | 1.77(0.92-3.41)* | 42 | 0.98(0.62-1.55) | 57 | 1.34(0.87-2.06) | 13 | 0.65(0.30-1.40) | 7 | 2.56(0.53-12.41) | NA | NA |
| like | 28,107 | 356,657 | 35 | 0.95(0.50-1.80) | 98 | 1.05(0.71-1.56) | 95 | 1.02(0.69-1.52) | 48 | 1.17(0.63-2.17) | 18 | 3.16(0.73-13.70) | NA | NA |
| Preference for fatty foods | | | | | | | | | | | | | | |
| dislike | 17,425 | 215,448 | 33 | 1.00 | 58 | 1.00 | 69 | 1.00 | 27 | 1.00 | 9 | 1.00 | NA | NA |
| so-so | 7,622 | 96,260 | 9 | 0.73(0.35-1.54) | 33 | 1.59(1.03-2.44)* | 33 | 1.37(0.90-2.09) | 9 | 0.69(0.32-1.49) | 4 | 1.15(0.35-3.78) | NA | NA |
| like | 26,917 | 342,106 | 35 | 0.75(0.46-1.21) | 90 | 1.11(0.80-1.55) | 96 | 1.00(0.73-1.37) | 40 | 0.92(0.56-1.50) | 15 | 1.17(0.51-2.68) | NA | NA |

*Adjusted for age and area of study. ** p<0.01; * p<0.05; †p<0.10 NA: not applicable

Table 3. Continued. Age-adjusted Hazard Ratios* and 95% Confidence Intervals(95% CI) According to Dietary Habits and Patterns

| | No. of subjects | Person -years | Kidney cancer | | Urothelial tract cancer | | Non-Hodgkin's | | Multiple myeloma | | Myeloid leukemia | | Ischemic heart disease | | Cerebrovascular | |
|--------------------------------------|-----------------|---------------|---------------|-------------------|-------------------------|-----------------|---------------|------------------|------------------|------------------|------------------|-----------------|------------------------|-------------------|-----------------|-------------------|
| | | | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) | No | HR(95%CI) |
| Men | | | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | | | |
| <3/day | 11,522 | 139,125 | 16 | 1.00 | 25 | 1.00 | 22 | 1.00 | 12 | 1.00 | 15 | 1.00 | 210 | 1.00 | 356 | 1.00 |
| 3-4/day | 20,352 | 252,803 | 20 | 0.72(0.37-1.39) | 43 | 0.98(0.59-1.62) | 47 | 1.23(0.72-2.09) | 24 | 1.06(0.53-2.13) | 18 | 0.67(0.33-1.36) | 306 | 0.79(0.66-0.95)* | 624 | 0.91(0.79-1.03) |
| ≥5/day | 12,829 | 166,800 | 8 | 0.44(0.18-1.07)* | 22 | 1.04(0.57-1.91) | 21 | 1.01(0.54-1.91) | 10 | 0.79(0.33-1.88) | 10 | 0.54(0.23-1.27) | 118 | 0.59(0.47-0.75)** | 280 | 0.83(0.70-0.98)* |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | | | |
| <4/day | 15,465 | 198,365 | 23 | 1.00 | 31 | 1.00 | 32 | 1.00 | 17 | 1.00 | 15 | 1.00 | 225 | 1.00 | 426 | 1.00 |
| 4-6/day | 19,213 | 238,275 | 16 | 0.52(0.26-1.04)* | 34 | 0.94(0.53-1.67) | 35 | 0.98(0.56-1.74) | 18 | 1.13(0.49-2.61) | 19 | 0.98(0.45-2.12) | 252 | 0.87(0.71-1.07) | 516 | 0.88(0.76-1.02)* |
| ≥7/day | 7,613 | 92,774 | 3 | 0.15(0.04-0.54)** | 22 | 1.14(0.60-2.18) | 19 | 1.17(0.60-2.27) | 10 | 1.24(0.47-3.27) | 9 | 0.99(0.39-2.53) | 122 | 0.85(0.66-1.09) | 242 | 0.79(0.66-0.94)** |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 12 | 1.00 | 23 | 1.00 | 20 | 1.00 | 7 | 1.00 | 12 | 1.00 | 139 | 1.00 | 227 | 1.00 |
| 1/day | 20,026 | 252,317 | 16 | 0.87(0.36-2.10) | 38 | 0.76(0.40-1.41) | 43 | 1.08(0.58-2.03) | 23 | 2.10(0.80-5.49) | 18 | 0.90(0.37-2.21) | 268 | 0.82(0.64-1.04) | 636 | 0.97(0.81-1.15) |
| ≥2/day | 12,073 | 151,636 | 16 | 1.21(0.55-2.68) | 30 | 0.86(0.49-1.54) | 23 | 0.80(0.42-1.49) | 15 | 1.31(0.51-3.38) | 10 | 0.76(0.31-1.86) | 198 | 0.95(0.76-1.20) | 354 | 0.96(0.81-1.15) |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | | | |
| ≤1/two day | 10,597 | 128,560 | 12 | 1.00 | 23 | 1.00 | 20 | 1.00 | 7 | 1.00 | 12 | 1.00 | 139 | 1.00 | 227 | 1.00 |
| 1/day | 13,347 | 166,981 | 9 | 0.64(0.23-1.77) | 32 | 0.95(0.49-1.84) | 31 | 1.07(0.54-2.10) | 15 | 1.70(0.61-4.74) | 13 | 0.97(0.36-2.59) | 209 | 0.88(0.68-1.14) | 492 | 0.97(0.80-1.17) |
| ≥2/day | 18,752 | 236,972 | 23 | 1.20(0.57-2.51) | 36 | 0.77(0.44-1.35) | 35 | 0.87(0.49-1.55) | 23 | 1.60(0.66-3.85) | 15 | 0.78(0.34-1.74) | 257 | 0.89(0.72-1.11) | 498 | 0.96(0.82-1.14) |
| Preference for salty foods | | | | | | | | | | | | | | | | |
| dislike | 4,615 | 55,363 | 2 | 1.00 | 10 | 1.00 | 10 | 1.00 | 4 | 1.00 | 5 | 1.00 | 71 | 1.00 | 130 | 1.00 |
| soso | 15,663 | 194,035 | 13 | 2.36(0.53-10.5) | 32 | 1.31(0.64-2.69) | 22 | 0.77(0.36-1.63) | 12 | 1.09(0.35-3.41) | 16 | 1.00(0.36-2.77) | 189 | 0.98(0.75-1.30) | 404 | 1.19(0.98-1.46)* |
| like | 17,071 | 209,333 | 21 | 3.04(0.71-13.0) | 26 | 0.79(0.38-1.66) | 41 | 1.16(0.58-2.32) | 24 | 1.71(0.59-4.95) | 17 | 0.92(0.34-2.51) | 245 | 0.97(0.75-1.27) | 468 | 1.03(0.85-1.25) |
| Preference for fatty foods | | | | | | | | | | | | | | | | |
| dislike | 8,277 | 99,314 | 6 | 1.00 | 12 | 1.00 | 16 | 1.00 | 11 | 1.00 | 10 | 1.00 | 128 | 1.00 | 238 | 1.00 |
| soso | 11,249 | 139,775 | 17 | 2.55(1.00-6.52)* | 23 | 1.65(0.82-3.34) | 19 | 0.92(0.47-1.80) | 12 | 0.88(0.38-2.01) | 11 | 0.84(0.35-2.00) | 140 | 0.88(0.69-1.12) | 264 | 0.87(0.73-1.04) |
| like | 18,039 | 221,832 | 15 | 1.25(0.48-3.24) | 34 | 1.40(0.72-2.71) | 40 | 1.13(0.63-2.03) | 14 | 0.59(0.26-1.30) | 17 | 0.78(0.36-1.72) | 236 | 0.84(0.68-1.04) | 513 | 0.97(0.83-1.13) |
| Women | | | | | | | | | | | | | | | | |
| Bowls of rice (at present) | | | | | | | | | | | | | | | | |
| <3/day | 20,090 | 252,157 | 4 | 1.00 | 11 | 1.00 | 18 | 1.00 | 19 | 1.00 | 9 | 1.00 | 161 | 1.00 | 342 | 1.00 |
| 3/day | 29,479 | 382,537 | 7 | 0.98(0.29-3.35) | 21 | 1.11(0.53-2.32) | 36 | 1.25(0.70-2.23) | 20 | 0.60(0.32-1.14) | 17 | 1.22(0.54-2.78) | 211 | 0.81(0.65-1.00)* | 590 | 0.99(0.86-1.13) |
| ≥4/day | 11,922 | 157,465 | 8 | 4.85(1.35-17.4)* | 7 | 1.48(0.54-4.02) | 11 | 1.05(0.48-2.32) | 9 | 0.92(0.40-2.10) | 6 | 1.92(0.66-5.59) | 60 | 0.80(0.58-1.09) | 154 | 0.98(0.81-1.20) |
| Bowls of rice (at 30 years old) | | | | | | | | | | | | | | | | |
| ≤3/day | 27,372 | 361,142 | 6 | 1.00 | 24 | 1.00 | 18 | 1.00 | 24 | 1.00 | 14 | 1.00 | 199 | 1.00 | 435 | 1.00 |
| 4-5/day | 13,267 | 169,135 | 2 | 0.55(0.11-2.72) | 5 | 0.58(0.21-1.62) | 17 | 2.01(0.96-4.23)* | 4 | 0.33(0.11-0.97)* | 9 | 1.51(0.61-3.73) | 59 | 0.69(0.50-0.93)* | 198 | 0.94(0.79-1.13) |
| ≥6/day | 17,003 | 213,840 | 9 | 1.43(0.49-4.19) | 10 | 0.64(0.28-1.49) | 23 | 1.82(0.88-3.77) | 15 | 0.72(0.35-1.46) | 9 | 1.07(0.42-2.74) | 128 | 0.67(0.52-0.86)** | 363 | 0.83(0.71-0.97)* |
| Bowls of miso soup (at present) | | | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 6 | 1.00 | 11 | 1.00 | 14 | 1.00 | 14 | 1.00 | 6 | 1.00 | 121 | 1.00 | 232 | 1.00 |
| 1/day | 21,927 | 288,464 | 9 | 0.80(0.25-2.63) | 11 | 0.63(0.24-1.69) | 24 | 1.46(0.67-3.22) | 14 | 0.54(0.23-1.28) | 14 | 1.91(0.63-5.78) | 135 | 0.69(0.52-0.92)* | 451 | 1.08(0.89-1.30) |
| ≥2/day | 19,074 | 248,469 | 4 | 0.52(0.15-1.89) | 17 | 0.88(0.40-1.95) | 22 | 1.37(0.68-2.75) | 19 | 0.96(0.46-1.97) | 12 | 1.53(0.55-4.24) | 154 | 0.94(0.73-1.20) | 382 | 1.18(1.00-1.40)* |
| Bowls of miso soup (at 30 years old) | | | | | | | | | | | | | | | | |
| ≤1/two day | 17,493 | 215,832 | 6 | 1.00 | 11 | 1.00 | 14 | 1.00 | 14 | 1.00 | 6 | 1.00 | 121 | 1.00 | 232 | 1.00 |
| 1/day | 14,023 | 184,857 | 7 | 0.88(0.24-3.19) | 8 | 0.64(0.22-1.84) | 18 | 1.71(0.73-4.04) | 14 | 0.91(0.37-2.23) | 8 | 1.44(0.43-4.88) | 107 | 0.75(0.55-1.02)* | 336 | 1.05(0.86-1.28) |
| ≥2/day | 26,978 | 352,076 | 6 | 0.56(0.18-1.79) | 20 | 0.84(0.39-1.82) | 28 | 1.33(0.68-2.61) | 19 | 0.74(0.36-1.52) | 18 | 1.72(0.66-4.51) | 182 | 0.87(0.68-1.11) | 497 | 1.17(1.00-1.38) |
| Preference for salty foods | | | | | | | | | | | | | | | | |
| dislike | 9,590 | 119,607 | 7 | 1.00 | 2 | 1.00 | 15 | 1.00 | 7 | 1.00 | 6 | 1.00 | 76 | 1.00 | 160 | 1.00 |
| soso | 13,586 | 169,899 | 5 | 0.48(0.15-1.51) | 9 | 3.36(0.72-15.7) | 13 | 0.68(0.32-1.46) | 14 | 1.61(0.64-4.05) | 8 | 0.89(0.31-2.58) | 87 | 0.94(0.69-1.28) | 253 | 1.18(0.96-1.44) |
| like | 28,107 | 356,657 | 7 | 0.31(0.11-0.90)* | 13 | 2.20(0.49-9.83) | 28 | 0.65(0.35-1.23) | 14 | 0.74(0.30-1.85) | 13 | 0.68(0.26-1.79) | 162 | 0.82(0.62-1.08) | 453 | 1.00(0.84-1.21) |
| Preference for fatty foods | | | | | | | | | | | | | | | | |
| dislike | 17,425 | 215,448 | 6 | 1.00 | 8 | 1.00 | 17 | 1.00 | 10 | 1.00 | 10 | 1.00 | 138 | 1.00 | 356 | 1.00 |
| soso | 7,622 | 96,260 | 2 | 0.92(0.18-4.62) | 1 | 0.34(0.04-2.71) | 2 | 0.33(0.08-1.45) | 8 | 2.30(0.90-5.91)* | 6 | 1.45(0.52-4.03) | 41 | 1.01(0.71-1.44) | 105 | 0.90(0.72-1.12) |
| like | 26,917 | 342,106 | 10 | 1.15(0.41-3.18) | 18 | 1.59(0.69-3.68) | 37 | 1.52(0.85-2.71) | 20 | 1.49(0.70-3.21) | 11 | 0.73(0.31-1.72) | 155 | 0.93(0.74-1.17) | 422 | 0.90(0.78-1.04) |

Nutrition and Disease

*Adjusted for age and area of study. ** p<0.01; * p<0.05; * p<0.10