博士（栄養学）学位論文要旨

Food Intake Factors Related to Weight Loss and Weight Gain in the Working Population

職域集団の体重の増減に関連する食物摂取要因の検討

A Dissertation Presented to the Division of Nutrition Sciences
the Graduate School of Kagawa Nutrition University
for the Degree of Doctor of Philosophy

2018 年

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The number of obese individuals has increased worldwide. Obesity (body mass index [BMI] ≥ 25 kg/m^2) is particularly common among men aged 40–60 years, leading policy makers to attach importance to the prevention of obesity and metabolic syndrome among those of working age. The present study therefore aimed to investigate food intake factors related to weight loss and weight gain in the working population to gain a clearer understanding of which food intake factors are related to weight loss in this population.

Cohort study examining the association between vegetables consumption and weight gain in a single year among Japanese employees at a manufacturing company

Increased vegetables consumption is widely recommended as a strategy for health promotion. Although the association between vegetables intake and obesity has been examined in some cohort studies, it is unclear whether vegetables intake is associated with one-year weight gain (WG). Accordingly, I aimed to determine whether vegetables intake is related to WG risk by examining the association between a one-year WG of 3 kg or more and vegetables intake among Japanese employees. The study participants were 815 and 843 (in 2007 and 2008) food manufacturing company employees aged

19–60 years who underwent a health checkup. The participants were asked about their food consumption and nutrition, and they also responded to a validated self-administered diet history questionnaire (collection rate = 88% for 2007, 84% for 2008). The participants were followed through the next health checkup, with a total of 478 subjects participating in both surveys in 2007 and 2008. Odds ratios (OR) for one-year WG ≥ 3 kg by vegetables intake quartile were calculated using logistic regression models adjusted for covariates. The included covariates were the potentially confounding variables of sex, age, weight, and food consumption, as assessed at baseline.

The results of this analysis revealed that participants in the fourth quartile (Q4) of vegetables intake had a lower risk of a one-year WG of 3 kg or more than did those in the lowest quartile (Q1) (OR = 0.33, 95% confidence interval [CI]: 0.12–0.93, p for trend < 0.018), after adjusting for sex. Compared with the lowest quartile, the ORs for one-year WG ≥ 3 kg were 0.69 (95% CI: 0.29–1.68) for Q2, 0.37 (95% CI: 0.13–1.07) for Q3, and 0.27 (95% CI: 0.08–0.99) for Q4, after multivariable adjustment (p for trend < 0.028). This shows that a one-year WG of 3 kg or more was inversely associated with high vegetables intake. Increased vegetables intake among Japanese employees may represent an effective strategy to control one-year WG.

Relationship between rice consumption and body weight gain in Japanese workers: white versus brown rice/multigrain rice

We investigated the relationship between white or brown/multigrain rice consumption and a one-year WG of at least 3 kg by conducting a secondary analysis of data from a nutrition and lifestyle survey collected for a one-year cohort study as part of routine medical checkups among Japanese workers at a food factory in Tokyo (n = 478). These study participants were divided into white rice and brown/multigrain rice consumption groups, and further classified by rice consumption tertile. Multiple logistic regression analyses were performed by rice consumption tertile to predict a one-year WG of at least 3 kg.

For white rice consumption, the risk of a one-year WG of 3 kg or more was significantly greater in the third tertile (high white rice consumption) than in the first tertile (low white rice consumption) ($p=0.048$) after adjustment for age, sex. This was maintained after adjustment for age, sex, and consumption of other body weight change-related foods ($p=0.034$). In the brown/multigrain rice consumption group, however, there was no significant difference in risk between the first and third tertiles, even after multivariate adjustment ($p = 0.387$).

Here, we found that white rice consumption was positively correlated with the risk of

a one-year WG of 3 kg or more, whereas brown rice/multigrain rice consumption was not. This finding suggests that brown rice/multigrain rice consumption is useful for body weight control among Japanese workers.

Conclusions

This study investigated the consumption of vegetables and cooked rice, including white, brown and multigrain rice, as well as the presence or absence of WG of 3 kg or more in one year, to examine dietary intake factors related to weight loss and weight gain in the working population. Those with a lower consumption of vegetables had a higher odds of experiencing a one-year WG of at least 3 kg than did those with the highest vegetables consumption. Among the participants who ate white rice, there was an association between the level of rice consumption and a WG of at least 3 kg over one year; those with higher levels of rice consumption had a higher odds of experiencing this WG than did those with the lowest levels of consumption. However, among those who consumed brown or multigrain rice, no association was seen between the level of rice consumption and a one-year WG of 3 kg or more.

These results provide effective evidence for the population approach to public health nutrition for the purpose of controlling WG in the working population. The findings can

also serve as a resource on the value of increasing vegetables consumption and replacing white rice with less-refined staples, such as brown rice or multigrain rice, for professionals providing education on nutrition and weight control.