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**Impact of interactions between self-reported mental stress and habitual exercise on the dietary intake of Japanese men and women: A large-scale cross-sectional study**

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It has been demonstrated that two major diseases, heart disease and cancer, are strongly associated with lifestyle behaviors, such as habitual exercise, alcohol drinking, smoking, and diet. Currently, mental stress (MS) is considered as one of the heaviest global burdens of diseases. MS is also proposed to be negatively related to lifestyle behaviors, such as habitual exercise and higher intake of fruits and vegetables rich in vitamins and minerals; however, little is known about the interactions of MS with lifestyle behaviors. Here, we investigated the interaction between self-reported MS (SRMS) and lifestyle factors to diet in a large-scale cross-sectional study, focusing on habitual exercise among middle-aged Japanese men and women who underwent annual health checkups. The subjects included 5,587 men and 2,718 women. They were divided according to their lifestyle factors, such as habitual exercise, alcohol drinking, and smoking status. Energy-adjusted food and nutrient consumption was assessed with a validated food frequency questionnaire. To estimate food and nutrient consumption, general linear models were performed for each SRMS level for each lifestyle factor. First, in women, natto (fermented soybean), "carrots and squash," other root vegetables (onions, burdock, lotus root), mushrooms, seaweeds, other 3 foods, vegetable protein, soluble, insoluble and total dietary fiber, daidzein, genistein, carotene, retinol equivalents, vitamin B<sub>2</sub>, pantothenic acid, potassium, calcium, magnesium, phosphorus and iron significantly interacted with SRMS levels and habitual exercise ( $p < 0.05$ ). In men, "raw and green leafy vegetables" and "fruit and vegetable juice" significantly interacted with SRMS levels and habitual exercise ( $p < 0.05$ ). Second, the SRMS and drinking status interacted with 11 foods, protein, animal protein, fat, animal fat, carbohydrate, monounsaturated fatty acid, polyunsaturated

fatty acid (PUFA), n-3 PUFA, n-6 PUFA, cholesterol, vitamin D, B<sub>2</sub>, B<sub>6</sub> and B<sub>12</sub>, niacin, pantothenic acid, magnesium, phosphorus, and zinc in men ( $p < 0.05$ ), but not in women. Third, in both men and women, smokers consumed less vegetables and fruits rich in antioxidants that are believed to prevent diseases, such as heart disease. Our findings indicated that the association between SRMS and dietary intake of vegetables and fruits are modified by habitual exercise, alcohol drinking, and smoking. Similar to the two major diseases, we must appropriately interpret such interactions for MS prevention. However, the causal relationship between MS and lifestyle factors was unidentified because of the study design. Further prospective studies are warranted to demonstrate the causality of interactions.

**Speaker Biography**

Kaori Endoh received her BS, MS, and PhD degrees from Kyoritsu Women's University in Japan. After conferral of her Doctorate, she worked for the National Institute of Health and Nutrition in Tokyo and the University of Niigata Prefecture in Japan. Since 2011, she has been working as a research Assistant Professor for the Laboratory of Public Health in the Department of Nutrition and Life Sciences at the School of Food and Nutritional Sciences of the University of Shizuoka, Japan. Her current research area is the study of interactions among mental health and diet in large-scale populations. After analyzing a cross-sectional study population that included approximately 10,000 middle-aged Japanese men and women, she published three first-authored papers on the interactions between mental health and lifestyle factors such as habitual exercise, alcohol drinking, and smoking to diet.

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