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Association between Minamata Disease Status and Activities of Daily Living among Inhabitants in Previously Methylmercury-Polluted Areas

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Objectives: Minamata disease (MD), first discovered in 1956, is a neurological disorder caused by mercury poisoning due to daily intake of fish and shellfish that have been contaminated by methylmercury discharged from chemical factories. However, reports of ill health increased sharply following the 2004 Supreme Court ruling instructing the Japanese government to pay damages to MD patients. We examined the distribution of disability in activities of daily living (ADL), and the association between MD status in terms of compensation system and ADL disability among the general population of previously methylmercury-polluted areas.

Methods: Data were collected by two-stage stratified sampling of residents 40–79 years old in 172 postal-code areas on the Shiranui Sea coast, the endemic area of MD. Questionnaires were distributed to eligible subjects ($n = 2,100$) and collected at a later visit or by mail. Information on demographic factors, basic ADL (BADL), and instrumental ADL (IADL) was obtained using questionnaires. We performed logistic regression analysis to assess the relationship between MD status in terms of compensation system and ADL disability.

Results: We classified the 1,422 residents who completed the questionnaire in accordance with their MD status in terms of compensation system: *Early* (those who received MD compensation before the Supreme Court decision), *Recent* (those who applied for compensation after the Supreme Court decision), *Not Yet* (those who have not yet applied for compensation, but have health-related anxieties about MD effects), and *Normal* (those who have not applied for compensation, and do not have health-related anxieties about MD effects). Adjusting for confounding factors, MD status was significantly associated with the disability grades of BADL and IADL with an increasing trend in the order of *Normal*, *Not Yet*, *Recent*, and *Early*. The odds ratios (95% CI) based on *Normal* were 2.08 (1.08–4.01), 3.87 (2.14–7.01), and 4.50 (2.66–7.61) for BADL and 2.41 (1.62–3.61), 3.20 (2.12–4.85) and 3.68 (2.52–5.38) in *Not Yet*, *Recent*, and *Early* for IADL, respectively.

Conclusion: *Early*, *Recent*, and *Not Yet* had lower ADL grades than *Normal*. Moreover, the population with a low ADL grade and health-related anxieties had increased throughout the previously methylmercury-polluted areas. The issue of ill health among populations living in previously methylmercury-polluted areas should be addressed in the wider context of public and community health.

Protective Effects of Buckwheat Hull Extract against Experimental Hippocampus Injury Induced by Trimethyltin in Rats

Nippon Eiseigaku Zasshi, 63, 711–716 (2008)
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Objectives: The main objective of this study is to clarify the protective effects of buckwheat hull extract (BWHE) against toxicant-induced spatial memory impairment and hippocampal neuron injury in rats.

Methods: Male Sprague-Dawley (Jsl: SD) rats were fed chow containing 0.75% (w/w) BWHE during the experimental period. Two weeks after the start of the experiment, trimethyltin (TMT) (8 mg/kg bw) was administered orally to 6-week-old rats. After another 2 weeks, the rats were subjected to the Morris water maze task, which was used to determine spatial memory impairment. On the day after the Morris water maze task was performed, the right hemi-hippocampi were removed from the right half of the brain and weighed. Coronal sections of the left half of the brain were cut into 16- μ m sections using a cryostat, and the number of neurons in each hippocampal region was evaluated by counting the surviving neurons using a light microscope.

Results: The impairment of spatial memory and the decrease in the hippocampal weight were observed after the TMT administration. Prolonged supplementation of BWHE seemed to reverse these TMT-induced toxic effects, and also improved the spatial memory of rats.

Conclusions: The present results suggest that the BWHE supplementation of foods enhanced the spatial memory of rats and may have protective effects against hippocampal neurodegeneration accompanied by spatial memory impairment.

Questionnaire Survey of Workers in Specific Buildings Regarding Multiple Chemical Sensitivity

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Objectives: The purpose of this study was to investigate the incidence of multiple chemical sensitivity (MCS) and effectiveness of the Quick Environment Exposure and Sensitivity Inventory (QEESI) in Japanese workers in specific buildings.

Methods: The survey was performed in 2004–2006 in Japan. QEESI (Japanese version) and a checklist on accumulation of fatigue developed by the Ministry of Health, Labour and Welfare were used in the examination of 410 workers in specific buildings. Three criteria of QEESI's "symptom severity", "chemical intolerance", and "other intolerance" were evaluated in this study. Clinical histories were also surveyed.

Results: Responses were obtained from 368 (89.8%) workers. The results showed that 132 (35.9%) individuals have been diagnosed as having allergy. Only two (0.5%) individuals were found to be MCS patients. There was no sick building syndrome patient. Applying the "high" criteria with QEESI to the standard of Miller and Ashford, we determined that only four (1.1%) individuals met all the three criteria, and 17 (4.6%) individuals met two of the three criteria. The QEESI score of allergy persons was higher than that of nonallergy persons. Among nonallergy persons, those who have a high score on accumulation of fatigue in the checklist showed a high score in QEESI.

Conclusions: These findings indicated that the QEESI score tended to increase with workload and be high in individuals with allergy. Therefore, careful consideration is required, when QEESI is applied for screening MCS patients in Japan.

Iodine Concentration in Current Japanese Foods and Beverages

Nippon Eiseigaku Zasshi, 63, 724–734 (2008)
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Objective: In the present study, we determined iodine concentration in commonly consumed foods in Japan.

Methods: Totally 139 foods and beverages were purchased from local markets and convenience stores. These samples were examined for iodine concentration by using gas chromatography after ashing or extraction.

Results: The iodine concentrations in various food groups were as follows. The concentrations in cereals, sugar, sweeteners, vegetables, fruit, milk, and meat were too low to be detected (<0.05 mg/100 g). The iodine concentrations of algae and *dashi* (Japanese broth or stock) from algae were <0.05–225 mg/100 g; Japanese seasoning, <0.05–10.5 mg/100 g; and iodine-rich eggs, 1.09–2.00 mg/100 g.

Conclusions: Food and beverages with high iodine concentrations need to be taken into account in the nutritional survey for health hazards and benefits in the evaluation of daily nutritional intake.

Does the Population Approach Increase Health Inequality? Vulnerable Population Approach as an Alternative Strategy

Nippon Eiseigaku Zasshi, 63, 735–738 (2008)
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The population approach is well recognized as an effective strategy to improve population health, as well as the population-at-risk approach. It aims to decrease risk exposure of the total population through a change of contextual conditions. However, the population approach has the possibility of increasing health inequality because of variation in the effectiveness of the strategy in accordance with the risk exposure. This paper proposes the "vulnerable population approach" as an alternative and supplemental strategy. It aims to decrease health inequalities between socially defined groups, by shifting the distribution of a lower level of risk exposure of the groups through changes in social and environmental conditions that make groups at higher risk. No interventional approach can be singly applied to all health problems. To improve population health, it is important to select the most effective strategy among the three approaches, considering their advantages and limitations, and to adopt a suitable combination of different approaches.

Health Effects of Nanoparticles and Nanomaterials (III) Toxicity and Health Effects of Nanoparticles

Nippon Eiseigaku Zasshi, 63, 739–745 (2008)
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As described before in the first Frontier Report of this series, there are two types of nanoparticles to be considered in hygiene science; one is the environmental nanoparticle emitted from automobiles and the other is the manufactured nanoparticle. In general nanoparticles (<100 nm) are reported to be permeable through cell membrane and tissues and their large surface area is responsible for the greater toxicity compared to larger particles. However, there

are contradictory reports on the health effects of nanoparticles. Recent reports suggest that carbon nanotubes, fiber-shaped biopersistent nanoparticles, resemble asbestos in the pathogenesis of granuloma and mesothelioma. As such we summarize health effects of environmental and manufactured nanoparticles in the literature so far including our studies, in this report.