Dietary and lifestyle changes before and after diagnosis of cardiovascular disease

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Background : Although the presence or absence of cardiovascular disease (CVD) recurrence is related to lifestyle habits, including diet, evidence for the maintenance of dietary improvement among CVD survivors after acute treatment is scarce.

Aim : To determine changes in diet and other lifestyle factors in CVD survivors in the Japan Public Health Center-based Prospective Study (JPHC study) over a 5-year period before and after diagnosis by comparing changes with participants without a diagnosis of CVD.

Methods : Participants were 68733 subjects aged 45-76 years at the baseline survey. Intakes of seven nutrients and 16 food groups were estimated using Food Frequency Questionnaires at the baseline survey and 5-year follow-up survey, and the amount of change was determined. Those diagnosed with CVD during the 5-year follow-up period were defined as CVD survivors (800 cases) and those not diagnosed were considered the non-CVD controls. Differences in the change between the two groups over the 5-year period were examined using the Mann-Whitney U test and multivariate linear regression analysis. Changes in smoking status, body mass index (BMI), and physical activity were compared by logistic regression analysis.

Results : CVD survivors appeared to restrict sodium intake after diagnosis, and even after energy adjustment were more likely to avoid eating sodium, miso soup and pickles. In addition, they were less likely to eat beef and pork than controls. Significantly more CVD survivors than controls stopped smoking and had decreased BMI.

Conclusion : CVD survivors showed a greater improvement in lifestyle following diagnosis than those who were not diagnosed.

Investigating relative importance of environmental factors for ambulance dispatch in Tokyo

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Background : Environmental factors, such as weather and air pollution, are known to affect human health and increase medical services demand, including emergency ambulance dispatches (EADs). However, the relative contribution of these exposures on daily EAD fluctuations remains understudied, limiting our ability to develop effective adaptation and mitigation strategies.

Objectives : To examine the feature importance of various environmental factors influencing all-cause EADs in Tokyo, Japan, using Random Forest (RF) and Generalized Additive Model (GAM).

Methods : We developed RF and GAM to predict the daily all-cause EADs in Tokyo during summer months (June-September) from 2016-2019, using daily time series of all-cause EAD, weather (temperature, humidity, wind speed, and sunshine duration), and air pollutant (PM $\leq$2.5 μm, suspended particulate matter, nitrogen dioxide, sulfur dioxide, and ozone) data. For feature importance analysis, GAM and RF models were trained using data from 2016-2018 (training set), and validated on data from 2019 (test set). Model performance was assessed using the coefficient of determination (R2) and root mean square error (RMSE). We applied leave-one-variable-out (LOVO) to assess how each environmental factor affected model performance. A greater reduction in R^2 or increase in RMSE indicates a more influential factor.

Results : We analyzed 673,207 EADs during the study period. Based on performance metrics, while the adjusted R^2 suggested that GAM out performed RF (GAM: 46%, RF: 32%), RMSE suggested that both models were relatively comparable (GAM: 57, RF: 55). Both models consistently identified temperature, sunshine duration, and ozone as the top three predictors of all-cause EADs.

Conclusions : This study identified temperature, sunshine duration, and ozone as key environmental drivers influencing daily EAD in Tokyo during summer, highlighting the importance for climate adaptation and public health strategies.

Spatial Clusters in Cancer Incidence and Mortality in Japan: A Flexible Scan Statistics Approach

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Objective : While identifying factors contributing to high cancer incidence and mortality is important, understanding areas with low cancer burden is also essential for developing effective cancer control strategies. This study aimed to identify spatial clusters with high (hot spots) and low (cold spots) cancer incidence and mortality across Japan, stratified by sex and cancer site.

Methods : Cancer incidence and mortality data (2016-2018) were obtained from the National Cancer Registry and Vital Statistics of Japan, respectively. Population data were sourced from the 2015 National Census. Analyses were conducted for all 1,896 municipalities in Japan. In each municipality, observed numbers of cancer cases and deaths were aggregated by 5-year age groups, and expected counts were estimated by applying national age-specific rates (in 5-year age groups) to the corresponding population. Flexible scan statistics based on the restricted likelihood ratio were applied to identify spatial clusters of cancer incidence and mortality for six cancer sites (stomach, colorectal, liver, pancreas, lung, and breast) by sex. All analyses were conducted using the *rflexscan* package in R.

Results : Statistically significant spatial clusters of both cancer incidence and mortality were detected ($p < 0.05$), and their locations varied by cancer site. For cancers with better prognosis, incidence and mortality clusters did not necessarily overlap. In some regions, inverse patterns were observed, such as cold spots in incidence corresponding to hot spots in mortality. In contrast, for cancers with poor prognosis, incidence and mortality clusters tended to coincide.

Conclusion : This study highlights spatial disparities in cancer incidence and mortality across Japan. Identifying clusters of incidence may contribute to planning primary prevention, while comparing incidence and mortality clusters may support the improvement of secondary prevention, including early detection and appropriate treatment.

Prevalence of nonrestorative sleep before and during the COVID-19 pandemic in Japan

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Background : Japanese people sleep less compared to other countries around the world. We investigated whether sleep duration (SD) and nonrestorative sleep (NRS) among Japanese people have improved or worsened due to the COVID-19 pandemic.
Methods : Data were drawn from the Comprehensive Survey of Living Conditions, a nationwide cross-sectional sample based on self-administered questionnaires. We analyzed 426,510 people in 2019 and 375,578 people in 2022 aged >19 living in the community. The generalized estimating equations of the multivariable Poisson regression models were used to estimate adjusted prevalence of NRS by survey year. Potential confounders included gender, age, marital status, family size, housing tenure, household expenditures, education, employment status, medical history, lifestyle behaviors, mental health, and SD.
Results : Among the study participants, 35.7% slept less than 6 hours and 20.9% had NRS. The prevalence of SD of <6 hours was significantly lower in 2022 than in 2019 for both men and women. By gender and age, the prevalence of short SD (<6 hours) significantly decreased for both men and women under the age of 49, but increased significantly for men aged >49 and women aged >74. The prevalence of NRS was significantly lower in 2022 than in 2019 regardless of gender and age: Prevalence among men was 21.4% in 2019 and 18.8% in 2022, and prevalence among women was 23.7% in 2019 and 21.2% in 2022. After adjustment for potential con founders, the difference between the 2022 NRS prevalence and the 2019 NRS prevalence was minus 1.64 percent point (pp) (95% confidence interval -1.82pp to -1.46 pp, P <0.001), showing a significant decrease in the 2022 NRS prevalence.
Conclusions : The prevalence of NRS among the general population in Japan was significantly reduced during the COVID-19 pandemic compared to before the COVID-19 pandemic. We need to monitor whether this decline continues or returns to pre-pandemic levels.