

論 文 要 旨

Relationship between changes in the public health nurses' workforce
and the empirical Bayes estimates of standardized mortality ratio:
A longitudinal ecological study of municipalities in Japan

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Background: The role of public health nurses (PHNs) in the community is expected to become increasingly important, along with the promotion of a comprehensive community care system. However, a comprehensive study of all municipalities is yet to be undertaken, and the relationship between the workforce of PHNs and health indicators is yet to be clarified. This study examined the effect of workforce change among PHNs, one of the structural indicators of PHNs' activities regarding changes in the empirical Bayes estimate of standardized mortality ratios (EBSMRs).

Methods: An ecological study was conducted using municipality-level aggregate data. The data used were publicly available Japanese government statistics. The first-difference model of panel data analysis was used to examine the relationship between changes in EBSMR and changes in the number of PHNs per 100,000 population from 2010 to 2015, adjusting for the effects of population and other healthcare resources, including the number of physicians, medical clinics, general hospitals, and welfare facilities. The variation by the 47 prefectures was added to the linear model as a random effect. We also performed a sensitivity analysis using the full Bayesian inference using the Besag-York-Mollie model.

Results: For males, EBSMRs for all causes and malignant neoplasms significantly decreased with an increase in the number of PHNs per population (coefficients: -1.00 and -0.89, p values: 0.008 and 0.043, respectively). For females, although all EBSMRs except malignant neoplasms showed decreased tendencies due to the increase in the number of PHNs per population, none of them were significant. The full Bayesian inference confirmed these associations.

Conclusions: An increase in the number of PHNs per population was significantly associated with a greater reduction in deaths from all causes and malignant neoplasms in males. The results of the full Bayesian inference also suggest that the workforce of PHNs may be related to changes in standardized mortality ratios for deaths from all causes in females.