Member ID: 10940   **Abstract No.** 10721

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Title : Income distribution, social capital, individual socioeconomic status, and self-rated health of the aged in Chita peninsula, Japan: a multilevel analysis

Objective & Design: This study aims to reveal the linkage among population health, income distribution and social capital of 28 school districts in Chita peninsula, Japan, using multilevel analysis. The design of this study is cross sectional multilevel analysis. Data was collected on self-rated health, age, sex, household income and other socioeconomic characteristics at individual level from the representative sample of 28 school districts among 6 municipalities in Chita peninsula, Japan, in 2003. The survey was targeted at 29374 people aged 65 years and older without the need of nursing care. We collected 14798 questionnaires (50.4%), and used, in this study, 12775 samples (43.5%) with information on self-rated health, age, and sex.

Main outcome measure: Self-rated health status (1=fair/poor; 0=very good/good) Individual-level variables: The individual-level variables of age, sex, equivalised income, marital status, and educational attainment were used to control compositional effects. Equivalisation was achieved by dividing the total household income by the square root of the number of people in the household. School-district level variables: Three school-district level variables were used: average income, Gini coefficient and social capital. Average income, and Gini coefficient as an indicator of income distribution among the aged were calculated by the equivalised income. A social capital index was made by the factor analysis with the variables such as network (mean number of participation in volunteer groups, civic groups, sports groups, and hobby groups), reciprocity, and the subscription rate of newspaper.

Method & Results: Logistic regression with 2-level random intercept was used. Models were fitted using MLwiN2.01 software with Predictive Quasilikelihood (PQL) second-order estimation procedures being applied. When personal socioeconomic characteristics (i.e., age, sex, equivalised income, marital status, and educational attainment), and average income at school district level were controlled for, a significant linkage between poor self-rated health and income inequality at the school district level measured by the Gini coefficient was observed (odds ratio 1.16 based on 0.05 change of Gini coefficient, 95% confidence interval 1.06 to 1.27). Moreover, the social capital index was significantly associated with good self-rated health. The association between social capital index and self-rated health became insignificant after adjustment with Gini coefficient.

Conclusions: Inequality in the distribution of income among the aged was independently associated with an adverse impact on health after adjusting for age, sex, equivalised income, marital status and educational attainment. The reduction of association between social capital index and self-rated health after adjusting for Gini coefficient suggested that some part of relation between social capital and self-rated health is explained by income inequality, and that income inequality gives an adverse effect on individual health through the deterioration of social capital.