

学位論文の要旨

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学位論文名 Effect of Residential Environment and Lifestyle on Hypertension

発表雑誌名

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著者名

} Refer to the attached document

論文内容の要旨

INTRODUCTION

Over the past several years there have been efforts to examine the associations between characteristics of residential environment and hypertension (HTN). Most of these studies have focused on two broad factors: physical environment (e.g. walkability and remoteness) and social environment (e.g. social capital). More recently research on the association between residential remoteness of the physical environment and HTN has gained momentum with increasing attention being paid to geographic information systems (GIS). Although the only study has estimated the residential remoteness between each subject's village center and the population center, the distance between the subject's actual addresses and the population center was not examined. In addition, no previous study has examined the effects of residential remoteness-lifestyle associations on HTN. More specifically, transportation is an important lifestyle factor determining the subjects' behaviors in rural region. The present study was therefore designed to investigate the effect of residential remoteness according to the subject's location by latitude and longitude on HTN by attention to access to car transport.

MATERIALS AND METHODS

This is a cross-sectional population-based study. We analyzed data from the Shimane COHRE study conducted from 2006 to 2009 in the rural mountainous regions of Japan. A total of 1,348 subjects were included in this study. Subjects' actual residential locations and the location of the Shimane prefectural government (i.e. population center) were geocoded by latitude and longitude to estimate the residential remoteness. Network analysis, which determined the shortest path between the subjects' locations and the population center, was

performed on road networks and then the distance was divided into tertiles: 0–26,685.8 m = close distance, 26,685.9 m–38,350.6 m = moderate distance, and 38,350.7 m–68,070.1 m = far distance. For the analysis, the four HTN were defined as follows: (1) taking antihypertensive medication (Model 1A), (2) taking antihypertensive medication or under treatment without medication (Model 1B), (3) taking antihypertensive medication or blood pressure (BP) \geq 140/90 mm Hg for systolic BP (SBP)/diastolic BP (DBP) (Model 2A), (4) taking antihypertensive medication or under treatment without medication or BP \geq 140/90 mm Hg for SBP/DBP (Model 2B). Access to car transport was measured by self-reported questionnaire, and divided into two groups: car use or non-car use. We also considered the following variables in the analyses: age, sex (male, female), employment (agriculture, self-employed, other, or unemployed), body mass index (BMI), stress (currently feel stress = yes or do not currently feel stress = no), alcohol consumption (non-drinker or drinker), smoking (non-smoker or smoker), physical activity (regularly engaged in physical activity = yes or did not regularly engage in physical activity = no), and use of medication treatment (dyslipidemia or diabetes).

Odds ratio (OR) for HTN adjusted confounding factors was examined by logistic regression.

RESULTS AND DISCUSSION

First, we explored the effect of residential remoteness, the shortest path between the subjects' location and the population center, on HTN. In our subjects, of these 510 were male and the mean (s.d.) age was 65.0 (6.9) years. 337 (25.0%) subjects engaged in agriculture. In total, 116 (8.6%) subjects were smokers, and 564 (41.8%) subjects reported drinking alcohol. Almost half (45.6%) of the subjects had stress, and about 30% of the subjects engaged in physical activity regularly. Approximately 70% of the subjects reported that a car was their main transport in their daily life. In addition, 177 (13.1%) used medication for dyslipidemia and 54 (4.0%) for diabetes. The mean (s.d.) BMI was 22.5 (2.9) kg/m². For the model 1A definition of HTN (i.e. taking antihypertensive medication), the ORs for HTN were 1.29 (95% confidence interval (CI): 0.93–1.79) and 1.52 (95% CI: 1.09–2.11) in moderate and far distances, respectively. For the Model 1B definition of HTN (i.e. taking antihypertensive medication or under treatment for HTN without medication), the ORs for HTN were 1.44 (95% CI: 1.04–1.99) and 1.78 (95% CI: 1.29–2.46) in moderate and far distances, respectively. The ORs no longer remained significant after considering the measurement of BP to define HTN (i.e. Models 2A and 2B definition of HTN).

We therefore examined whether or not the associations between residential remoteness and HTN vary by access to car transport. Of these 954 used a car as their primary transport in daily

life. Non-car users were generally of relatively older age, female, unemployed, non-smoker, non-drinker, lower BMI, physically active, and with treatment for dyslipidemia. There were no significant differences between non-car use and car use groups relative to HTN.

In non-car use group, the ORs for Model 1A definition of HTN were 2.21 (95% CI: 1.19–4.08) and 2.55 (95% CI: 1.00–6.51) in moderate and far distances, respectively. Using the Model 1B definition of HTN (taking antihypertensive medication or under treatment for HTN without medication), the ORs for HTN were 2.29 (95% CI: 1.26–4.18) and 2.73 (95% CI: 1.09–6.82) in moderate and far distances, respectively. The ORs no longer remained significant after considering the measurement of BP to define HTN (i.e. models 2A and 2B definition of HTN).

While car use group, Model 1A analysis showed no significant associations between residential remoteness and HTN (moderate distance: OR = 0.95, 95% CI: 0.62–1.46; far distance: OR = 0.95, 95% CI: 0.55–1.62). In addition, Model 1B analysis demonstrated no significant associations between residential remoteness and HTN. Furthermore, similar patterns were observed in subjects from both the Models 2A and 2B analyses with no statistically significant associations between residential remoteness and HTN.

These results suggest that lack of access to transport may be important in predicting/determining HTN in rural regions. One explanation for this is that lack of access to transportation may lead to lower utilization of health services (e.g. health education programs) as well as unbalanced diet. In other words, greater distance may impose a significant barrier to access for health services or healthy food. In non-car use group, the mean distances to the nearest clinic in the moderate and far distance groups ($3,195.9 \pm 3,492.0$ m and $5,915.9 \pm 5,770.2$ m, respectively) were significantly farther than in the close distance group ($1,301.5 \pm 1,420.5$ m; $P < 0.01$). Moreover, the mean nearest distances to public transportation in the moderate and far distance groups (463.6 ± 662.9 m, $1,193.2 \pm 1,330.7$ m, respectively) were significantly farther than in the close distance group (233.1 ± 175.8 m; $P < 0.01$). Further studies are needed to provide a more comprehensive understanding of the associations between availability to car transport and access to health-promoting services in this rural region.

CONCLUSION

Our findings show that residential remoteness might be associated with a higher risk of hypertension in a rural region in Japan. However, its associations vary by access to car transport.

別紙

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- 1 . Is Location Associated With High Risk of Hypertension?
Shimane COHRE Study
- 2 . Effect of Environmental and Lifestyle Factors on Hypertension:
Shimane COHRE Study

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