学 位 論 文 の 要 旨

氏名　　鎌田　真光

学 位 論 文 名　Environmental Correlates of Physical Activity in Driving and Non-Driving Rural Japanese Women

発 表 雑 誌 名　Preventive Medicine
（巻: 初頁～終頁等, 年）　(**49**: 490-496, 2009)

著 者 名　Masamitsu Kamada, Jun Kitayuguchi, Shigeru Inoue, Hiroharu Kamioka, Yoshiteru Mutoh, Kuninori Shiwaku

論 文 内 容 の 要 旨

INTRODUCTION

Engaging in regular physical activity reduces the risks of many chronic diseases. However, physical inactivity remains a common public health problem in developed and developing countries. Thus, promoting physical activity should be a public health priority. Along with demographic, psychological, behavioral, and social factors, environmental factors have also been suggested as determinants of physical activity from an ecological perspective. To better understand people's behavior and plan effective interventions, examining for moderators (effect modifiers) of relationships between environmental attributes and physical activity is a key issue.

In rural areas, where public transport is less used than in urban areas, while adjusting for socioeconomic status, driving status (i.e., with or without a driver's license) reportedly has a significant impact on health-related behaviors, such as the frequency of health-care visits. Rates of licensed drivers among women and the elderly are lower than among adult men. Thus, better understanding of the influences of driving status on their daily behavior is important for planning interventions that promote physical activity among those populations. However, it remains unclear whether environmental factors influence people's physical activity levels differently in any population groups according to their driving status.

Therefore, this study aimed to (1) describe environmental correlates of physical activity among rural Japanese women, including closer analyses of public transport, and (2) examine whether these relationships vary with driving-status categories (i.e., drivers vs. non-drivers).

MATERIALS AND METHODS

Questionnaires were mailed to 1,000 women aged 40 to 64 years living in Unnan City, Shimane, Japan. They were randomly sampled from the highest and lowest quartile population density areas equally so as to represent the diverse attributes of their environment. A total of 516 women (51.6%) responded. Those unable to walk unaided (n=4), or who lived in the Kakeya area, which is served by a public transport system different from neighboring localities (n=78), were excluded from analyses. Therefore, 434 respondents (84.1%) had usable data. Respondents were divided into drivers (n=319) and non-drivers (n=111) based on their self-reported driving status. Four respondents without driving status data were excluded from subgroup analyses.

Respondents were asked about time spent on physical activity during occupation, transportation and recreation-related activities over a typical 7-day week. We used the Japanese short version of the International Physical Activity Questionnaire (IPAQ). Respondents were divided into three categories: (1) sufficiently active (engaged in 150 min or more per week of moderate physical activity or 60 min or more per week of vigorous physical activity); (2) insufficiently active (moderate to vigorous physical activity insufficient to attain a "sufficiently active" level); and (3) inactive (no moderate or vigorous physical activities).

Perceived neighborhood environments were assessed by the Japanese version of the Environmental Module of the IPAQ (IPAQ-E). We used 7 core and 4 recommended items regarding: residential density; access to destinations including public transport; neighborhood infrastructure; aesthetics; social environment (seeing active people); neighborhood safety; and number of household motor vehicles. Objective measures of physical environments regarding public transport were determined for each respondent using the geographic information systems (GIS) database. This database included locations of neighborhood communities, train stations, and bus stops as well as the frequency of bus and train service. Euclidean (straight-line) distances from each neighborhood community location to the nearest train station and bus stop were calculated using the GIS software, and were assigned to each respondent. Bus service frequency to each of the nearest bus stops from each respondent's neighborhood community was assessed. Considering both the distance and the frequency of the nearest bus stop, the convenience of bus service was categorized into three scores (1: high; 2:moderate; 3: low) and assigned to each respondent.

Descriptive statistics were calculated for sociodemographic variables, physical activity, and environmental attributes. Multinomial logistic regression was used to investigate which environmental variables were related with physical activity. Adjustments were made for age, body mass index, general state of health, household economy, and selected variables, which were significantly associated with physical activity in univariate analyses based on type of

employment, engagement in farming, and parenting and/or caregiving status.

RESULTS AND DISCUSSION

About 40% of respondents were categorized as achieving a sufficiently active level of physical activity. Sufficiently active women were more likely to report good access to public transport (adjusted odds ratio (aOR) and 95% confidence intervals (CIs) =1.57 (1.01-2.44)), the presence of bike lanes (2.05 (1.30-3.22)) and good aesthetics (1.69 (1.09-2.63)) than inactive women. Good access to recreational facilities was reported significantly more often by the insufficiently active group (2.26 (1.15–4.47)) but not more often by the sufficiently active group (1.17 (0.75-1.81) than by the inactive group.

A significant interaction was observed only between the objectively measured convenience of bus service and driving status (P=0.023). Therefore, subgroup analyses were conducted regarding bus service convenience among drivers and non-drivers. Among drivers, convenient bus service and physical activity were somewhat negatively, though not significantly, associated (aOR (95%CI) =0.80 (0.42-1.52)). However, non-drivers in an area where bus service was moderately convenient were more likely to be active than those where it was least convenient (aOR (95%CI) =3.23 (1.00-10.41)).

As previous studies suggested, our results revealed both consistent and inconsistent links of social and physical environments to physical activity. To our knowledge, findings from this study demonstrated for the first time the potentially moderating effect of driving status on those associations. Considering the significant contribution of perceived good access to public transport, inconvenient public transport might at least have a negative effect on being physically active. People using public transport often walk to and from the public transport facility, and thus bouts of physical activity arise. In addition, it is natural to consider that for non-drivers unable to cover a long distance by themselves, convenient public transport would exert a greater influence on their daily use of it when compared with drivers. Rearranging the locations of bus stops and how often buses run is considered to be a feasible intervention for administrations to promote physical activity of people who cannot drive.

CONCLUSION

This study enhanced overall knowledge and understanding of environmental factors of physical activity among rural Japanese women and their differences in driving status, results that should prove useful for planning future interventions. Good access to public transport and recreational facilities, the presence of bike lanes, and good neighborhood aesthetics are likely to be important factors promoting physical activity. Especially in non-drivers, convenient bus service is considered important for promoting their physical activity.