Contribution of nature areas to residents' health in urban and suburban areas in Helsinki, Finland

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Background

Urban and suburban greenspaces are increasingly acknowledged to provide an essential resource for residents' mental and physical well-being and can be influential during both leisure time and commuting. In many cities, however, land-use pressures leading to intensifying land use and compact city structure fail in taking into account the potential of nature areas to enhancing health and well-being of residents. Although Finnish cities are still fairly green compared to the European average, heavy pressures are placed on the green spaces of the largest growth centers, in particular in the Helsinki Metropolitan Area. Key information serving urban planning in this context include what kind of green infrastructure within and around cities supports health and wellbeing of different types of residents and how the use of these areas can be promoted among various user groups.

Although the association of green exposure and health has been increasingly studied, including mediation of health benefits through physical, social or relaxation actions within the green environment (e.g. Hartig et al. 2014, Korpela et al 2010, Pietilä et al. 2015, Maas et al. 2008), there is still a lack of consistent scientific knowledge of the associations between green exposure, physical activity and experienced health benefits, and how the perceived quality of the physical environment influence health-related behaviors. The main aim of this study was to investigate the underlying linkages of perceived health, use of neighborhood green areas, and green infrastructure in residence living environment in respect of accessibility and quality of green areas.

Data and Methods

A survey data from Helsinki, were collected by using a mail questionnaire. A random sample of 15-75 years old residents were drawn from the census. A total of 872 residents (41.2 %) responded to the survey. Information of respondents' health was obtained by asking: "How would you describe your present health status?" reflecting an individual assessment of his or her health with a Likert-type of scale from one to five. Respondents were divided into two groups according to their living district and postal code number. They were categorized either urban (/city center) (n=229) or suburban residents (n=636). Some differences were found between these two areas in respect to residents' socio-economic factors, how permanently they had stayed in the housing area, use of the green areas, both supply of green areas and the how well the area will fulfill the residents' expectations.

The survey data were supplemented with precise, GIS-derived data of each respondent's quality of the living environments to describe the amount and quality of

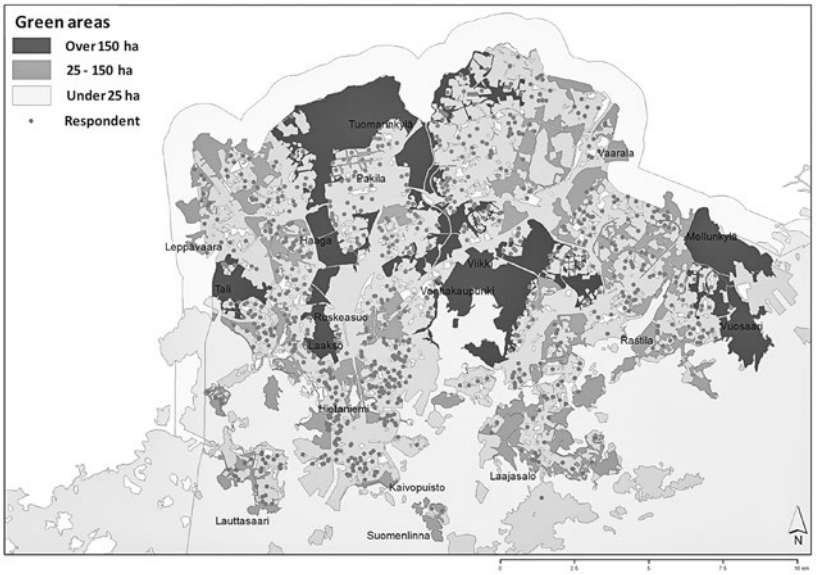

Figure 1. *Map of green areas in Helsinki and the location of respondents*

green areas in the living environment. Moreover the data included respondent reported information of the environment regarding the amount and accessibility of green space in residents' neighborhood area. The respondents' home location provided a link to the GIS-dataset. This study utilized several spatial measures, such as the *distance to the closest* green area or water element, and distances to three green area classes (small, middle-sized and large green areas (over 150 hectare)) as well as percentage of green and water areas within a one-kilometer radius from the informants' home.

Pearson Chi-Square and T-test were used to analyze the difference between urban and suburban areas and Spearman correlation to test the linkages between studied factors. Path analysis was utilized to study the associations between the greenness of (or blueness of) the residents' neighborhood environment, visits to nature, and they relation to the health. The analysis started with Helsinki suburban residents followed by the similar model structure but with residents living in the most urban parts of the Helsinki.

Results and Discussion

The results show that the good supply of and easy access to green spaces contributes to improved perceived health throught increased physical activity in the suburbs. Good accessibility to green areas (distance) with residents' satisfaction to green areas in regard to nature experiences, a place for promoting social interaction and outdoor activities correlated positively with the usage of neighbourhood green areas and consequently had a positive indirect association with better health status. Thus, in order to promote health to suburban residents, access to close-to-home greenspaces suitable for recreation should be secured. In more urban residential areas,

greenspaces were connected to more frequent visits, but the association between health and more frequent use were not statistically proven.

This study demonstrated the difficulty to describe the quality of living environment for residents' point of view. The objectively measured GIS-variables functioned less well as an explanatory variable than residents' own subjective assessment of the accessibility of the green areas in the statistical models.

The research results contribute to understanding the role and importance of close-to-home recreational opportunities in urban green spaces. Easy accessibility to greenspaces should be an important objective in the management and planning of urban and suburban forests and other greenspaces. In contrast, large scale land-use intensification and taking nature areas for construction in suburbs may lead to decreased physical exercise and consequently to increased health related lifestyle diseases.

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