

Chapter 42

Spatial Aspects of Mortality Rates and Neighborhood Environmental Characteristics in Seoul Mega City Region, South Korea

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ABSTRACT

This study of the spatial patterns of standardized mortality rates (SMRs) in Seoul Mega City Region (SMCR) explores whether neighborhood characteristics affect mortality rates and identifies important determinants of spatial disparity in mortality rates in SMCR. Spatial patterns of mortality rates show a strong positive spatial autocorrelation, suggesting that mortality rates are spatially clustered. A spatial lag model and a GWR model were used to reflect the spatial aspect of mortality rates. The spatial lag model showed better model fitness by considering spatial dependence of mortality rates. It indicates that a higher level of residential deprivation, a less walkable environment, less economic affluence and less social participation are all associated with higher mortality rates with statistical significance. This study suggests that health and welfare policy could incorporate urban planning to consider the neighborhood factors which determine mortality rates in order to improve the health of neighborhood residents.

1. INTRODUCTION

Over the last decade, interest has increased in how neighborhood characteristics affect residents' obesity, life expectancy, morbidity, and mortality (Gorden-Larsen et al., 2006; Rutt & Coleman, 2005; Wilkins et al., 2008). The effects of neighborhoods' social and economic features on mortality rates, general health status, health behaviors, and other risk factors of chronic disease have been the subject of studies in public

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health, urban planning, and geography. Relationships between neighborhood conditions and residents' health have significant policy implications for improving public health and reducing health disparities.

Research on how neighborhoods affect health has paralleled studies on the social determinants of health. Emphasis on the social determinants of health has been spurred by the Commission on Social Determinants of Health (CSDH), a global network of policy makers and researchers established by the World Health Organization (WHO). The Commission has addressed social factors in areas of poor public health and has acknowledged the effects of social and political conditions on geographic health inequality. Social determinants of health may include income, occupation, and education. Furthermore, these determinants may ultimately affect individual health outcomes through intermediate determinants such as material circumstances, psychosocial circumstances, and behavioral and biological factors (Solar & Irwin, 2010). Material circumstances include factors such as neighborhood quality and material consumption potentials. Psychosocial circumstances include social support, relationships, or perception of social and physical aspect of the environment. Behavioral and biological factors include nutrition, physical activity, and genetics. A mechanism of various structural factors of both society and individuals operates as causes of health disparity, but the root cause of health disparities is a structural mechanism in a socioeconomic and political context. This theoretical framework explains disease distribution by using approaches that incorporate proximal and distal factors and emphasizes the combined role of society, economy, and biology (Yen & Syme, 1999).

On a macro scale, this macrostructural mechanism results in differences among neighborhoods by building different residential environments through economic policies and political decisions. Neighborhoods mediate the way in which the structural mechanism affects residents, thereby carrying weight in the geographic variation of health. Even though the concept of neighborhoods is ambiguous (Diez Roux, 2001), neighborhoods can be defined in terms of social relationships and individuals' interaction patterns, such as the place where one shops, attends religious services, or attends meetings of volunteer organizations (Chaskin, 1997; Guest and Lee, 1984; Tienda, 1991). Individual behavioral patterns can depend on the physical arrangements of and social processes in the neighborhood. The way the neighborhood is structured can affect a resident's health, and differentiations between neighborhoods can result in health disparities. The meaning of neighborhoods constitutes a spatial segment, embracing social relationships and physical resources (Jones & Moon, 1993; Macintyre et al. 1993). It therefore has composite and intricate implications.

Previous studies of neighborhood in relation to health outcomes have suggested that three dimensions need to be taken into account for health disparities: economic condition (especially deprivation), physical environment, and social capital. Based on the literature, mortality rates tend to be higher in economically poor neighborhoods. Physical and social neighborhood environments can also have a strong effect on the choices and consumption of resources available to residents. Aspects of neighborhood design such as walkable environments can promote health by encouraging exercise habits (or healthy behaviors). People are more likely to be physically active when their neighborhoods have sidewalks and parks (both of which are conducive to exercise) and accessible public transportation (Bedimo-Rung et al., 2005; Floyd et al., 2011; Handy et al., 2002; Maibach et al., 2009; Saelens et al., 2003; Sallis et al., 2004; Tsai, 2009). Strong ties and trust among people within such neighborhoods have also been associated with better health (Kawachi et al., 1997; Lochner et al., 2003).

However, few studies have reflected on the multidimensional aspects of neighborhoods in terms of residents' health. In addition, despite much research on health and places, empirical questions on what specific aspects of the neighborhood context matter in health outcomes remains unexplored (Carpiano,

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