



Neighborhood housing deprivation and public health: Theoretical linkage, empirical evidence, and implications for urban planning



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ARTICLE INFO

Article history:

Received 23 March 2016

Received in revised form

20 June 2016

Accepted 24 June 2016

Keywords:

Housing disadvantage

Integrated deprivation index

Neighborhood deprivation

Public health

Health in urban planning

China

ABSTRACT

Housing has been acknowledged as one of the principle levels at which neighborhood deprivation occurs in recent literature. The urban political community thus advocates to devise research programs for examining the association between neighborhood housing deprivation and public health. Based on previous social medical studies, this paper proposes a theoretical framework for the mechanistic links between neighborhood housing deprivation and public health; and then quantifies their associations at district level in the case of Shenzhen, China. Data at district level in 2010 are collected for five health outcomes (cardiopathy, chronic pneumonia, general physical fitness, liver cancer, and mental health hospitalizations). Using varimax rotated principle component analysis, we establish an integrated neighborhood housing deprivation index (INHDI) by combining six domains of variables that comprehensively reflect the housing disadvantage (internal facilities, living space, physical form and structure, attached facilities, affiliated natural amenities, affordability). Spatial regression is employed to quantify the association between INHDI and public health, using income, occupation and education as control variables. Results show that housing deprivation acts as a significant exploratory factor for all the health outcomes. Variances decomposition shows that the individual contribution of housing deprivation is stronger than that of socioeconomic disadvantage for cardiopathy, chronic pneumonia and liver cancer. Differently, general physical fitness and mental health hospitalizations are more subjected to the joint impacts of housing deprivation and socioeconomic disadvantage. Path analysis demonstrates that the casual pathways between housing deprivation and public health are quite complex. The developed INHDI can serve as a practical tool to facilitate urban planning with health considerations. This study captures the nuanced health disparities varied with housing deprivation, and therefore produces some more generalized knowledge that ultimately help develop housing construction plans aimed at promoting public health.

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1. Introduction

Neighborhood deprivation refers to the relatively disadvantaged economic (e.g., low income, blue-collar jobs), social (e.g., low education level, non-voter), and physical conditions (e.g., graffiti, low-rent housing) of a neighborhood (Galobardes, Shaw, Lawlor, Lynch, & Davey, 2006; Krieger, Williams, & Moss, 1997). Neighborhood economic, social, and physical environment can shape individual risk factors in behavior and biology, which may impact health outcomes through a diversity of biological mechanisms (Masi,

Hawkey, Piotrowski, & Pickett, 2007). A number of longitudinal studies and systematic literature reviews have reported associations between neighborhood deprivation and prospective adverse health outcomes (Brennan-Olsen et al., 2015; Erhunmwunsee, Joshi, Conlon, & Harpole, 2012; van Vuuren, Reijneveld, van der Wal, & Verhoeff, 2014). However, a limitation of neighborhood deprivation literature is that overwhelming emphasis is placed on socioeconomic factors such as occupation, income, and education (Erhunmwunsee et al., 2012; Lian et al., 2011; Yuan & Professor, 2013). The political community has moved forward a step with the recognition that neighborhood deprivation should incorporate the housing dimension other than the socioeconomic ones (European Commission, 2009; Scottish Government, 2009). Only in

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most recent years, theoretical consensus has been reached on the need to devise research programs for the multi-dimensional characterization of neighborhood deprivation (British Medical Association Board of Science and Education, 2003; Rodero-Cosano, Garcia-Alonso, & Salinas-Perez, 2014; World Health Organization and World Bank Group, 2011). Many scholars have acknowledged housing as one of the principle levels at which neighborhood deprivation occurs (Navarro, Ayala, & Labeaga, 2010; Nolan & Winston, 2011; Palvarini & Pavolini, 2010; Urbanos-Garrido, 2012; Weng, Pi, Tan, Su, & Cai, 2016). In light of this strand of analysis, the association between housing deprivation and public health should be examined.

Housing is an important public health issue (Braubach, 2011; Gibson, Petticrew, Bambra, Wright, & Whitehead, 2011; Lawanson & Fadare, 2013; Shaw, 2004). The scientific community has good theoretical reasons to believe the empirical linkages, since housing conditions can regulate environmental exposure, shape behaviors and affect lifestyles, and subsequently impact public health (Navarro et al., 2010). A wealth of cross-sectional studies have reported the statistical correlations between public health and a variety of housing characteristics, including dwelling quality, structure, tenure and affordability (Baker, Bentley, & Mason, 2013; Ellaway & Macintyre, 1998; Evans, Hyndman, Stewart-Brown, Smith, & Petersen, 2000; Free, Howden-Chapman, Pierse, Viggers, & the Housing H.H.S.R.T, 2010; Imrie, 2006; Macintyre et al., 2003; Mason, Baker, Blakely, & Bentley, 2013; Pollack, Griffin, & Lynch, 2010). The statistical correlations can be used as tools to understand the associations, although they may not necessarily suggest causality (Bentley, Baker, & Mason, 2012). Overall, previous literature has suggested different mechanisms and we summarize the potential pathways in the conceptual framework (Fig. 1) hypothesizing the association between housing and public health:

- The internal facilities determine the hygienic conditions (e.g., bathing, toilet), which in turn associate with several infectious diseases or non-communicable diseases (Evans et al., 2000; Thomson & Thomas, 2015);

- Better attached facilities (e.g., public institution, service facilities) and greater affiliated natural amenities (e.g., green spaces, blue spaces) indicate less environmental exposure and higher proximity to services for daily basic needs, which can enhance the social interactions and independent living (Braubach, 2011; Imrie, 2006). Such activities can produce potential effects on quality of life, disease development, and mental well-being (Saidj, Jørgensen, Jacobsen, Linneberg, & Aadahl, 2015);
- The housing physical form and structure can shape residential behaviors (e.g., physical activity) and influence pollutant dissemination, generating significant effect on public health (Saidj et al., 2015);
- The rapidly increasing housing prices and corresponding higher debt relative to income can generate great stress on the residents (Corman, Curtis, Noonan, & Reichman, 2016; Kavanagh et al., 2016). People living in rental housing or with great burden are expected to present poorer mental and physical health (Ellaway & Macintyre, 1998; Macintyre et al., 2003; Pollack et al., 2004).

This body of research gives rise to an alarming challenge for urban planners: urban planning lies beyond the jurisdiction of health sectors and is frequently without the participation of public health experts. This challenge has motivated the increasing call for “health in all policies” using cross-sector approaches (World Health Organization & Government of South Australia, 2010). As such, practical tools that facilitate the integration of health into urban planning are needed for government agencies to revise housing construction plans, make decisions, and develop regulations. In order to make progress towards achieving these perspectives, it first requires replicable and evidence-driven methodological framework to identify the impact of housing deprivation on public health. However, prior studies have used various indicators to characterize the neighborhood housing context (Navarro et al., 2010; Nolan & Winston, 2011; Palvarini & Pavolini, 2010; Urbanos-Garrido, 2012), making it difficult to compare and

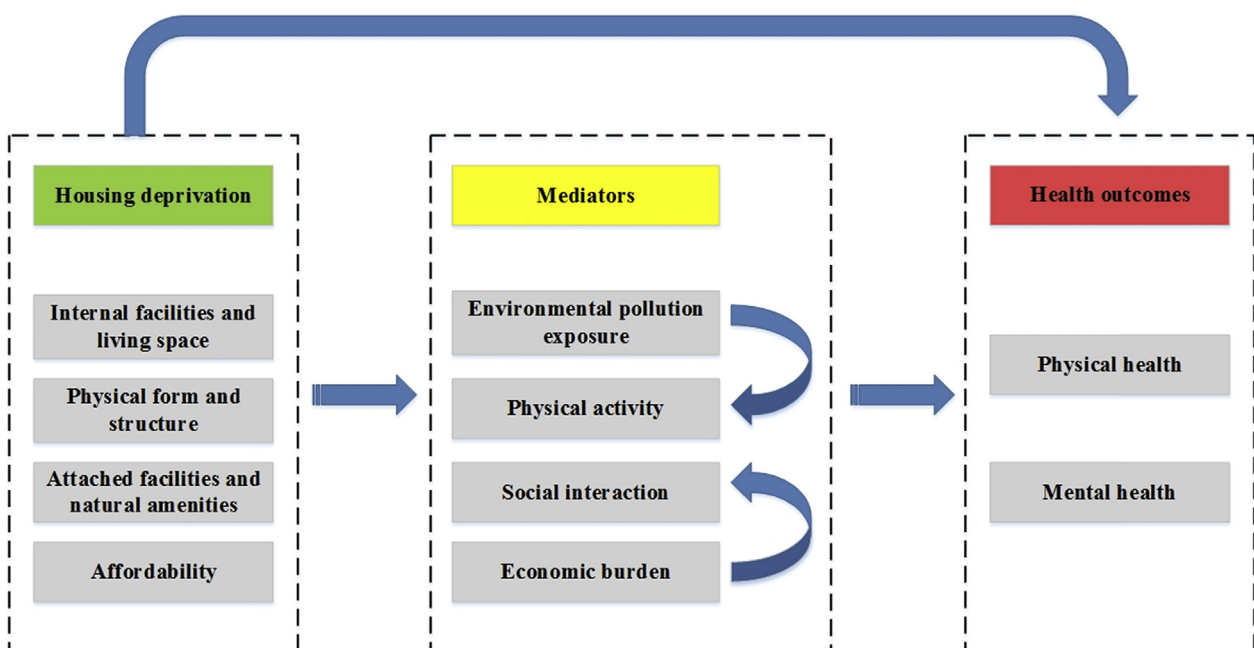


Fig. 1. Conceptual framework for the potential mechanistic links between housing deprivation and public health.

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