Health & Place 44 (2017) 43–51

Contents lists available at ScienceDirect

Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Do social relations buffer the effect of neighborhood deprivation on health-related quality of life? Results from the LifeLines Cohort Study

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ARTICLE INFO

Keywords:
Quality of life
Residence characteristics
Social environment
Social support
Socioeconomic factors

ABSTRACT

We investigated whether social relations buffer the effect of neighborhood deprivation on mental and physical health-related quality of life. Baseline data from the LifeLines Cohort Study (N=68,111) and a neighborhood deprivation index were used to perform mixed effect linear regression analyses. Results showed that fewer personal contacts (b, 95%CI: −0.88(−1.08;−0.67)) and lower social need fulfillment (−4.52(−4.67;−4.36)) are associated with lower mental health-related quality of life. Higher neighborhood deprivation was also associated with lower mental health related quality of life (−0.18(−0.24;−0.11)), but only for those with few personal contacts or low social need fulfillment. Our results suggest that social relations buffer the effect of neighborhood deprivation on mental health-related quality of life.

1. Introduction

Health-related quality of life is a concept used to assess how diseases affect individual well-being. Health-related quality of life refers to a person's level of physical, emotional, and social functioning and is measured using objective and subjective evaluations. Health-related quality of life is not only affected by individual factors, such as diseases, life style factors and social support, but also by factors related to the environment in which people live (Dale et al., 2013; Netuveli et al., 2006). For example, studies in Europe, the U.S., Australia and South America have consistently shown that individuals living in neighborhoods of higher socioeconomic deprivation have a lower health-related quality of life than individuals living in neighborhoods of lower socioeconomic deprivation (Gary-Webb et al., 2011; Wainwright and Surtees, 2004; Zhang et al., 2011; Myint et al., 2009; Adams et al., 2009; Pruitt et al., 2012; Feldman and Steptoe, 2004; Duran et al., 2013; Zenk et al., 2005; Sampson et al., 1997; Lovasi et al., 2009). This association is irrespective of a person's own socioeconomic position (Gary-Webb et al., 2011; Wainwright and Surtees, 2004; Zhang et al., 2011; Myint et al., 2009; Adams et al., 2009; Pruitt et al., 2012; Feldman and Steptoe, 2004). The association between neighborhood socioeconomic deprivation and health-related quality of life can partly be explained by a lower availability of healthy food stores and community resources, smaller social cohesion, and higher crime rates in neighborhoods of higher socioeconomic deprivation (Zhang et al., 2011; Zenk et al., 2005; Sampson et al., 1997; Lovasi et al., 2009). It is unknown whether and to what extent differences in the prevalence of diseases across neighborhoods play a role in the explanation of the association between neighborhood deprivation and health-related quality of life.

Next to the neighborhood in which a person lives, health-related quality of life is affected by a person's social relationships (Nyqvist et al., 2013; Thoits, 2011; de Belvis et al., 2008; Netuveli et al., 2006; Steverink and Lindenberg, 2006). Studies have shown that both objective aspects, such as the number of personal contacts, and subjective aspects of social relationships, such as the fulfillment of social needs, are important for health-related quality of life (Nyqvist et al., 2013; Thoits, 2011; de Belvis et al., 2008; Netuveli et al., 2006; Steverink and Lindenberg, 2006). Social need fulfillment theory states that everyone has intrinsic social needs, including affection, behavioral confirmation and status (Steverink and Lindenberg, 2006; Ormel et al., 1999; Nieboer et al., 2005). Quality of life has been shown to be dependent on the extent to which these intrinsic social needs are fulfilled (Steverink and Lindenberg, 2006; Nieboer et al., 2005).

Besides a direct effect, social relationships have an indirect effect on health-related quality of life. According to Cohen's stress buffering hypothesis, social relationships can buffer the effect of external stressors on health and related outcomes (Helgeson, 2003; Cohen

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http://dx.doi.org/10.1016/j.healthplace.2017.01.001
Received 15 April 2016; Received in revised form 23 December 2016; Accepted 10 January 2017
1353-8292/

and Wills, 1985). Thoits suggested seven mechanisms through which social relationships can buffer the effect of external stressors (Thoits, 2011). These mechanisms are social influence, social control, role-based purpose and meaning, self-esteem, sense of control, belonging and companionship, and perceived support availability (Thoits, 2011). Persons who live in a neighborhood of higher deprivation experience more stress (Brenner et al., 2013; Boardman et al., 2001). To our knowledge, it is unknown whether social relations can buffer the effect of neighborhood deprivation on health-related quality of life. Therefore, our aim is to investigate to what extent personal contacts and social need fulfillment buffer the effect of neighborhood deprivation on health-related quality of life.

2. Methods

2.1. Study population

We used data from the adults baseline subsample of the Dutch LifeLines cohort study (Scholtens et al., 2015; Klijs et al., 2015; Stolk et al., 2008). The cohort profile of LifeLines is described elsewhere (Scholtens et al., 2015). Briefly, LifeLines is a large population based representative cohort study and biobank in the three northern provinces of the Netherlands aiming to investigate universal risk factors for multifactorial diseases (Scholtens et al., 2015; Klijs et al., 2015; Stolk et al., 2008). The recruitment of participants (N=167,729) was carried out between 2006 and 2013. The LifeLines Cohort Study is conducted according to the principles of the Declaration of Helsinki and in accordance with research code University Medical Center Groningen (UMCG). The LifeLines Cohort Study is approved by the medical ethical committee of the UMCG, the Netherlands. All participants signed an informed consent form before they received an invitation for the physical examination. All participants visited one of the LifeLines research sites, where anthropometric and blood pressure measurements were taken and fasting blood samples were collected. Participants filled out extensive questionnaires including items on demographic and socioeconomic characteristics, chronic diseases, personal contacts and social need fulfillment. We used a first released dataset of adult participants whose home addresses had been geocoded and linked with information on the participants' neighborhoods (reference year 2011) available through Statistics Netherlands (N=68,761) (Statistics Netherlands, 2013). We excluded 650 individuals (0.9%) with missing measurements on health-related quality of life, which resulted in a final study sample of 68,111 individuals.

2.2. Health-related quality of life

Health-related quality of life was measured using the Dutch version of the RAND-36 (Hays and Morales, 2001; van der Zee and Sanderman, 1993). The RAND-36 is composed of eight multi-item scales (35 items) assessing physical functioning (10 items), role limitations due to physical health problems (4 items), bodily pain (2 items), general health (5 items), vitality (4 items), social functioning (2 items) role limitations due to emotional problems (3 items), and emotional well-being (5 items) (Hays and Morales, 2001; van der Zee and Sanderman, 1993). Using a standard procedure, the eight scales were aggregated into a mental (MCS) and physical component summary score (PCS) (Ware et al., 1994). The MCS and PCS are between 0 and 100. A higher score indicates a better health-related quality of life. The RAND-36 has good psychometric qualities and has been shown to be a responsive measure of population health (van der Zee et al., 1996; Hemingway et al., 1997).

2.3. Index of neighborhood deprivation

Information on the percentage of low income households, the percentage of persons (aged 15–65 years) receiving assistance benefits, and the percentage of owner occupied houses in the participants' neighborhoods was available through Statistics Netherlands (Statistics Netherlands, 2013). These percentages can be seen as proxy indicators of material resources, wealth and insecurity in the participants' neighborhoods (Myint et al., 2009). Following earlier studies that investigated the relationship between neighborhood conditions and functional health, the three indicators of socioeconomic conditions were aggregated into a single index of neighborhood socioeconomic status, using principal component analysis (Myint et al., 2009). The loadings of separate indicators on the index were 0.55 or higher. The index explained 85% of the overall variability. The index was Z-standardized.

2.4. Number of personal contacts and social need fulfillment

Individuals were asked to report the number of different persons with whom they had contact on average within two weeks' time (continuous scale). People were instructed only to count those contacts in which personal matters were exchanged or discussed, either through written or oral communication. The number of personal contacts was categorized as less than 5, 5–9, 10–14, and 15 or more contacts in two weeks. Social need fulfillment was assessed using the nine items on social well-being from the short version of the Social Production Function Instrument for the Level of well-being (SPF-IL) (Steverink and Lindenberg, 2006; Nieboer et al., 2005). These nine items of the SPF-IL assess affection (3 items), behavioral confirmation (3 items) and status (3 items) (Steverink and Lindenberg, 2006; Nieboer et al., 2005). Behavioral confirmation is the feeling of doing the 'right' thing in the eyes of 'relevant' others or yourself (Steverink and Lindenberg, 2006; Nieboer et al., 2005). Examples of the items assessed are 'Do you feel that people really love you?', 'Do you feel useful to others?' and 'Are you known for the things you have accomplished?'. All items in the SPF-IL have the following answer categories: never, sometimes, often, and always. Each item is scored on a 4-point scale (range 0–3) (Steverink and Lindenberg, 2006; Nieboer et al., 2005). The item scores were summed to calculate an overall social need fulfillment score. Social need fulfillment was categorized as 'low' (< =14 points), 'middle' (15–17 points) and 'high' (18–27 points). The SPF-IL is a valid and reliable measure of social need fulfillment (Nieboer et al., 2005). The categorization for 'number of personal contacts' and 'social need fulfillment' was chosen in such a way that the categories captured the non-linear relationships with health-related quality of life and resulted in a sufficient number of persons in each category. In our data, the correlation between number of personal contacts and social need fulfillment was only low (Cramer's V of 0.11).

2.5. Other control variables

The household equivalent income was calculated as the net household income divided by the square root of the number of persons living on this amount (Organization for Economic Cooperation and Development, 2011). Household equivalent income was categorized into less than €1000, €1000 to €1299, €1300 to €1599, €1600 to €1899, and €1900 or more per month and 'don't know or prefer not to answer'. Highest education obtained was categorized into elementary (no or primary education), lower secondary (junior secondary pre-vocational education, junior general secondary education), upper secondary (senior general secondary or pre-university education), and tertiary (higher professional education or university). Several diseases are associated with lower health-related quality of life (Garin et al., 2014; Dale et al., 2013). To control for chronic diseases in our analysis, variables indicating the presence of absence (1 or 0) of the following diseases were constructed: depression, panic disorder, other mental disorders, chronic non-specific lung disease, cancer, diabetes mellitus, myocardial infarction, stroke, osteoarthritis, rheumatoid arthritis, and incontinence. Other control variables were age (contin-