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Article

Social network resources and self-rated health in a deprived Danish neighborhood

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Summary

Research has demonstrated that living in a deprived neighborhood contributes to the occurrence and development of poor health. Furthermore evidence shows that social networks are fundamental resources in preventing poor mental health. Neighborhood relationships and networks are vital for sustaining and improving quality of life. However, to determine potentials for public health action, the health impact of various types of network resources need to be explored and the association between socioeconomic position and self-rated health needs to be analysed to determine whether it is partially explained by social network resources. This is the main aim of this article. Cross-sectional data from one deprived neighborhood located in Denmark were collected in 2008 and 2013 using a postal health survey. The target group was defined as adults older than 16 years. In 2008, 408 residents participated in the survey, and 405 residents participated in 2013. Our main explanatory variables were indicators of socioeconomic positions and social network resources. The analyses were conducted using univariate and bivariate analyses and multiple logistic regressions. The results showed that there was a significant decrease in respondents being involuntarily alone during the period from 2008 to 2013. An impact of the association between disposable income and self-rated health was found, showing that low income residents with a better social network also have slightly higher odds of having good self-rated health compared with residents with higher income. This investigation is the first Danish study that repeats a health survey in the same neighborhood to measure possible improvement in health among residents. More longitudinal research is needed in the future to explore the complex relationship between social network resources, social capital and health in neighborhoods.

Key words: deprived neighborhood, social network resources, social capital, self-rated health, health promotion intervention

BACKGROUND

Self-rated health is an important measure of a person's general health status (Idler and Benyamini, 1997; Nummela *et al.*, 2007). Multiple studies have shown that poor self-rated health is more prevalent among people in poor, socially disadvantaged positions (Nummela *et al.*, 2007). Particularly, the results of multilevel studies have shown that the residents of deprived

neighborhoods are more likely to rate their health as fair or poor than residents of more affluent neighborhoods (Stafford and Marmot, 2003; White *et al.*, 2011).

People's health depends on the characteristics of their social relationships and social structures in which they live (Cattell, 2001). Neighborhood relationships and networks are vital for sustaining and improving quality of life. Social networks, social support and coherence are not a natural given but can be constructed through strategies e.g. in health interventions and planning of health promotion initiatives. The notion of social capital embraces the embeddedness of individual social ties within the broader social structure (Kawachi *et al.*, 1997; Sampson *et al.*, 1997; Kawachi and Berkman, 2001). Social capital has roots in the social sciences. Emile Durkheim (1858–1917) and Max Weber (1864–1920) both emphasized the necessity of mutual trust to sustain a community and help the individuals sustain a meaningful life (Svendsen, 2001). In this study, we use Bourdieu's definition of social capital because it draws more explicit attention to social relations, community conditions and the socioeconomic factors that influence them. Pierre Bourdieu (1930–2002) was the first to make a thorough development and comprehensive definition of the concept. Bourdieu defines social capital as 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition' (Bourdieu, 1985). Bourdieu emphasizes that social capital is a product of a person's network and social relationships. Behind these ideas exist the assumption of a bound and social community (e.g. neighborhood) in which social relationships, exchange of experiences and shared structures/frameworks comprise the basis of integration (Andersen, 2013).

The article uses Bourdieu's definition of social capital with emphasis on person's network resources and social relationships (Andersen, 2013). The focus is therefore on the individual level and does not include structural variables in the analysis.

Within health science disciplines, neighborhood conditions and their impact on individuals have grown as a research field with substantial interest among researchers in recent years (Andersen *et al.*, 2011b). It has been demonstrated that people's health varies with neighborhood characteristics, and several studies have proven that especially socioeconomically poor areas, have higher morbidity and mortality rates (Pickett and Pearl, 2001; Macintyre and Ellaway, 2003).

Several epidemiological studies (Kawachi and Kennedy, 1999; Elliott, 2000; Steptoe and Feldman, 2001; Takeuchi and Williams, 2003; Tunstall, 2005; Matheson *et al.*, 2006; Nielsen and Krasnik, 2010) have documented neighborhood effects on health, specifically in deprived neighborhoods. Research has shown that living in a deprived neighborhood contributes to the occurrence and development of poor health (Pickett and Pearl, 2001; Poortinga *et al.*, 2008). Discussions have often focused on whether health effects of neighborhood deprivation are mainly the result of the concentration of people with low socioeconomic status (SES) living in these areas (compositional effect) (Reijneveld and Schene, 1998) or a contextual effect (Stafford and Marmot, 2003). According to the literature, health effects of neighborhood deprivation include both compositional as well as contextual effects but the greatest effect is individual SES of residents/populations living in deprived neighborhoods (Stafford and Marmot, 2003).

The results from a Swedish municipality study (Linden-Bostrom *et al.*, 2010) confirmed the importance of neighborhood and social capital in individual health. The results showed that poor self-rated health was associated with social capital, such as lack of personal support, and that neighborhood factors, such as housing area and residential stability, were associated with self-rated health. Furthermore, their results showed that poor self-rated health was more common among people living in areas with predominately large blocks of flats or areas outside the city center. Another important result was that people who had lived in the same area for short periods (1–5 years) reported poor health more frequently than those who had lived there for a longer time period.

Other results from a multilevel analysis of an English population-based study of 25,366 respondents (Verhaeghe and Tampubolon, 2012) indicated that generalized trust, participation with friends and relatives and having network members from the working class are positively associated with self-rated health. The purpose of this study was to examine the extent to which individual social capital mediates the relationship between neighborhood deprivation and self-rated health. Furthermore, the study showed that having network members from the working class is negatively related to self-rated health. Moreover, these social capital elements partly mediate the negative relationship between neighborhood deprivation and self-rated health.

The Danish and Scandinavian research on health in deprived neighborhoods is limited. Only a few Danish studies have been conducted, and most were cross-sectional (Mackenbach *et al.*, 1997; Andersen *et al.*, 2011a; Bak *et al.*, 2012, 2015). This article builds on these studies and the starting point for this longitudinal

study is a deprived neighborhood (Korskærparken) with 1842 adult residents. Of these 1321 are adults, 36.7% are immigrants (364 adults and 311 children under the age of 18), 4.7% are unemployed, 34.2% are single parents and 55.2% have a disposable income of less than the median disposable income in Denmark (DKK 150 000 per year) (Statistics Denmark, 2007). Of the 364 adult immigrants 224 (61.5%) receive either social benefits (the majority), incapacity benefits or sickness benefits (Andersen *et al.*, 2011a). 'Deprived neighborhood' is defined here as a geographically bounded area with a high proportion of adults outside the labor market, including people receiving social benefits, disability benefits or sickness benefits and people with low income, low education or low-paid jobs (Bak *et al.*, 2015). The neighborhood is located in the western part of the municipality of Fredericia in Denmark and has been on the Governments ghetto list several times. The Danish government's classification of an area as a ghetto requires that it meets at least two of three criteria: a proportion of non-Western immigrants exceeding 50% of the proportion of 18- to 64-year-old adults, a number of adults outside the labor market exceeding 40% and a number of convicts exceeding 270 persons per 10,000 persons in the neighborhood (Program Board for Dialogue and Balance in Vulnerable Neighborhoods, 2008).

The municipality of Fredericia has been focusing on this residential area attempting to reduce social inequity in health within the municipality since 2007. This has led to the implementation of various activities within the deprived neighborhood Korskærparken for the period 2008–13. In this period, 22 health promotion activities are stated in Korskærparken, including activities such as swimming, zumba, pilates, street dance and line dancing and the creation of a community center, a craft club and various smoking cessation and weight control courses (Andersen, 2013). The strategy in the area has been characterized by resident involvement and the municipality administration wanting to slowly withdraw from the organizational tasks. Early in the project the residents were invited to café meetings where decisions on a range of activities were made and a number of task groups were formed with the purpose of promoting health and well-being in the local area.

AIM OF THIS STUDY

The purpose of this article was to analyse whether the association between SES and self-rated health is partially explained by improvement in social network resources (social capital) among the residents comparing the survey data from 2008 with data from 2013.

METHOD

This article is based on survey data collected in 2008 and 2013 from the socially deprived neighborhood Korskærparken, located in Denmark (municipality of Fredericia). Over that time period, two local health profiles were launched to monitor the citizens' health and well-being.

In 2008, a total of 1321 people aged older than 16 years were living in the neighborhood. In 2013, the total number of people older than 16 years was 1315. The target group was defined as adults older than 16 years in Korskærparken. Both samples (2008 and 2013) consisted of 31% of the residents older than 16 years. In 2008, 408 residents agreed to participate in the survey, and 405 residents participated in 2013. Residents with an ethnic background other than Danish comprised 29% (2008) and 36% (2013) of the sample.

The data collection was carried out in spring of 2008 and autumn of 2013 by a consultancy firm (Capcent/Epinion), and the health profiles were financed by the municipality (Fredericia). Before the health profile survey took place information on the surveys was announced throughout the neighborhood through posters, flyers and information meetings. Data were collected both via telephone interviews (25% in 2008 and 23% in 2013) and via personal interviews (6% in 2008 and 8% in 2013) to include those who were not listed in the telephone directory and to avoid possible bias. The interviews were performed by a multilingual team of interviewers. The interviewers had different ethnic backgrounds and could assist with linguistic difficulties related to understanding the questionnaire.

Measures

Questionnaire

The questionnaires used in the study were constructed based on existing research (Ekholm *et al.*, 2006) and designed to collect information on sociodemographic and socioeconomic indicators, health behaviors, social factors and illness. The questionnaire used in 2008, consisting of 50 questions, was developed in an intervention study in Korskærparken that was conducted from 2008 to 2013. The questionnaire used in 2013 was similar to the 2008 questionnaire, with a few modifications and a few additional questions about the activities in the neighborhood. The additional questions were connected to the health promotion project in Korskærparken.

Self-rated health

We use a definition of self-rated health as an individual's view of the personal state of health. Within public health

research self-rated health is considered as a relatively accurate health indicator and recognized predictor of morbidity and mortality (Mossey and Shapiro, 1982; Kristensen, 1998; Singh-Manoux *et al.*, 2007). Negative views regarding one's health situation are therefore connected to increased risk of different kinds of diseases as cancer, heart diseases and death that leads to a pressure on the health care system resulting in increased medicalization and reduces the individuals own resources and abilities to function.

The questionnaire included in this study use the following questions to investigate self-rated health: 'how would you assess your present state of health?' (options: 'very good', 'good', 'fair', 'poor' and 'very poor') and the questions was dichotomized later by a combination of the following answers 'very good', 'good' and 'fair' into one category and the answers 'poor' and 'very poor' into another.

Socioeconomic status

SES was measured by occupational status, education level and disposable income. The occupational status was dichotomized into 'employed' and 'unemployed'. The educational level was divided into 'primary/secondary' including primary school and upper secondary education, 'vocational training' and 'higher' educations of 2.5 years or more. Disposable income is after-tax income minus all payments that are necessary to meet current bills. The disposable income is divided into three categories. 'Low' is a disposable income less than DKK 4000 (∼USD 600/€540 in 2015 currency) per month, 'middle' is DKK 4000–8000 per month and 'high' is more than DKK 8000 (∼USD 1200/€1070 in 2015 currency) per month.

Social network

Social network was measured by asking about the respondents' ethnic diversity in their social network and to what extent they felt safe living in Korskærparken. Furthermore, they were asked to what extent they were talking with neighbors also living in Korskærparken and to what extent they knew of and participated in activities in the neighborhood. The respondents were also asked whether they felt involuntarily alone and how often they met with family and friends. Each of the variables was dichotomized to measure whether the respondents had the resource or not.

Statistical analyses

An exploratory analysis included univariate, bivariate and chi-square tests to test for differences.

The analyses were conducted using univariate and bivariate analyses and multiple logistic regressions. It was examined whether the social network variables had changed from 2008 to 2013, adjusted for sex, age, ethnicity, education, occupation status and disposable income. To examine whether the social network impacted the association between SES (education, occupation status and disposable income) and self-rated health, an analysis was conducted adjusted for age, sex and social network. The social network variables included were variables that had a significant impact on self-rated health found by chi-square tests. Each of the analyses was also adjusted for the other two socioeconomic variables. The statistical analyses were performed using SPSS statistics version 21.0.

RESULTS

The characteristics of the study population in 2008 and 2013 are presented in Table 1. In the 2008 sample, the majority of the respondents were men and between 16 and 44 years. In the 2013 sample, the majority were women and older than 44 years. In both samples, the majority had a western background and was unemployed. Highest education level was least represented and 42.0% had a primary or secondary education level in 2008. This proportion increased to 52.2% in 2013. More respondents had a middle or low disposable income in 2013 compared with 2008. In both samples, the majority had ethnic diversity in their social network, felt safe, talked with neighbors, participated in activities, met with family and friends and had good self-rated health. There was a slightly increase in respondents knowledge about the activities, while the proportion of the respondents being involuntarily alone decreased from 2008 to 2013.

Table 1 also shows the differences in social network variables from 2008 to 2013. There was a significant decrease in respondents being involuntarily alone. Table 2 shows the association between SES and self-rated health in 2008 and 2013. A good social network did not impact the relationship between occupation status and self-rated health. The same result was found for education and self-rated health. This finding is because the odds ratio and significance did not change between the analyses without and with social network variables included. For low disposable income, the odds ratio slightly changed. This result indicates that social network moderately impacted the association between disposable income and self-rated health. Respondents with low disposable income and better social network had slightly higher odds of having good self-rated health than

Table 1: Characteristics of the study population in 2008 and 2013

Characteristics	2008		2013		Difference in social network 2008–13[a]	
	%	*n*	%	*n*	OR	95% CI
Age						
16–44 years	52.4	209	41.5	163		
+45 years	47.6	190	58.5	230		
Total	100	399	100	393		
Sex						
Women	48.5	208	53.3	216		
Men	51.5	196	46.7	189		
Total	100	404	100	405		
Ethnicity						
Western	74.3	298	67.3	270		
Non-Western	25.7	103	32.7	131		
Total	100	401	100	401		
Occupation status						
Employed	43.6	168	30.8	123		
Unemployed	56.4	217	69.2	276		
Total	100	385	100	399		
Education						
Highest	14.5	56	11.3	44		
Vocational training	43.5	168	36.6	143		
Primary/secondary	39.7	162	52.2	204		
Total	100	386	100	391		
Disposable income						
High	39.1	158	13.5	36		
Middle	27.5	111	42.5	113		
Low	33.4	135	44.0	117		
Total	100	404	100	266		
Ethnicity diversity in one's social network					0.87	0.61–1.24
Yes	58.3	235	63.1	253		
No	41.7	168	36.9	148		
Total	100	403	100	401		
Feeling safe					0.85	0.50–1.44
Yes	85.1	342	89.8	360		
No	14.9	60	10.2	41		
Total	100	402	100	401		
Talking with neighbors					0.82	0.56–1.20
Yes	67.7	272	73.6	296		
No	32.3	130	26.4	106		
Total	100	402	100	402		
Keeping up with activities					0.85	0.60–1.22
Yes	55.0	219	60.6	234		
No	45.0	179	39.4	152		
Total	100	398	100	386		
Participating in activities					0.94	0.63–1.40
Yes	25.9	103	28.8	114		
No	74.1	295	71.2	282		
Total	100	398	100	396		
Not involuntary alone					**0.56**	**0.38–0.83**
No	67.6	273	80.0	324		
Yes	32.4	131	20.0	81		
Total	100	404	100	405		

(continued)

Table 1: (Continued)

Characteristics	2008		2013		Difference in social network 2008–13[a]	
	%	*n*	%	*n*	OR	95% CI
Meeting with family					0.94	0.61–1.46
Yes	79.7	322	77.8	315		
No	20.3	82	22.2	90		
Total	100	404	100	405		
Meeting with friends					0.74	0.44–1.24
Yes	86.1	348	87.2	353		
No	13.9	56	12.8	52		
Total	100	404	100	405		
Self-rated health						
Poor	38.1	154	38.3	155		
Good	61.9	250	61.7	250		
Total	100	404	100	405		

Odds ratios (OR) with 95% confidence intervals (CI). OR in bold is significant.
[a]Adjusted for sex, age, ethnicity, education, occupation status and disposable income.

respondents with low disposable income and without a social network.

DISCUSSION

The repeated survey (2008 and 2013) in the deprived neighborhood (Korskærparken) in the municipality of Fredericia showed interesting results regarding the improvement of some social network resources. An important result was that there was a significant decrease in respondents being involuntarily alone in 2013 compared with 2008. It was also found that good social network did not impact the relationship between SES (occupation, education) and self-rated health. However, a moderate impact of the association between disposable income and self-rated health was found, showing that low income residents with a better social network also have slightly higher odds of having good self-rated health. In general, our findings support results from other studies that social networks are associated with self-rated health (Berkman and Glass, 2000; Kim *et al.*, 2006; Poortinga, 2006; Eller *et al.*, 2008; Heritage *et al.*, 2008).

In this study, an improvement of participation among residents in different social- and health-related activities is seen in the period from 2008 to 2013.Fostering local participation requires the building of notions of trust and reciprocity, in effect of the building of local political capital, within the community as well as to the municipality (Putnam, 2000). This is a big challenge in the neighborhood, thus often the residents distrust professionals and 'top-down' initiatives from the municipality. In this project, the residents claim their 'ownership' to the different health projects in the neighborhood. The 'bottom-up' approach to neighborhood change seems to have had an important role for how participation is incorporated in local partnerships and with voluntary organizations and passionate local people in improving local quality of life among the residents.

A document evaluation study of recruitment approaches in 12 deprived neighborhoods in Denmark between 2010 and 2014 found that social relations and trust between the residents and project employees is an important factor in the recruitment of marginalized groups as well as for adjusting the heath interventions or recruitment strategy to the target group's needs (Putnam, 1995; Rasmussen *et al.*, 2016).

The activities in Korskærparken in the period 2008–13 are based on a bottom-up approach which includes social elements that generate more contact between the participating residents. The different activities where organized and coordinated by a full-time employed project leader who had very close relations to the residents in Korskærparken and ensured a good involvement of the residents in the planning and completion of different activities. Most of the projects were initiated by the residents themselves and are run by a task group formed by the residents in cooperation with the project manager

A final evaluation indicated that the residents gradually developed an ownership of the project, although it was financed by the Municipality of Fredericia (Andersen and Bak, 2014). A center for elderly people was converted to a community center for all residents in the area and this change has probably also had an important impact on the increased participation in different activities among the residents.

Table 2: Association between SES and self-rated health

	2008						2013					
	Good self-rated health						Good self-rated health					
	%	*n*	OR	95% CI	OR[a]	95% CI	%	*n*	OR	95% CI	OR[a]	95% CI
Occupation status[b]												
Employed	77.4	130	1		1		74.8	92	1		1	
Unemployed	50.2	109	**0.42****	0.24–0.70	**0.43***	0.25–0.74	56.2	155	0.56	0.31–1.09	0.58	0.30–1.11
Education[c]												
Highest	69.6	39	1		1		72.7	32	1		1	
Vocational training	62.5	105	0.95	0.47–1.91	0.97	0.48–1.98	64.3	92	0.63	0.24–1.63	0.65	0.25–1.73
Primary/secondary	60.5	98	0.96	0.46–2.01	0.94	0.45–1.98	59.3	121	0.47	0.19–1.20	0.52	0.20–1.34
Disposable income[d]												
High	70.9	112	1		1		72.2	26	1		1	
Middle	64.9	72	0.70	0.39–1.25	0.73	0.40–1.32	61.1	69	0.74	0.31–1.81	0.70	0.28–1.77
Low	48.9	66	**0.44***	0.26–0.76	**0.48***	0.27–0.83	55.6	65	0.70	0.29–1.74	0.65	0.25–1.67

Odds ratios (OR) with 95% confidence intervals (CI). OR in bold is significant.
*p-value < 0.05.
**p-value < 0.001.
[a]Adjusted for feeling safe, not involuntarily alone and meeting with friends.
[b]Adjusted for age, sex, education and disposable income.
[c]Adjusted for age, sex, occupation status and disposable income.
[d]Adjusted for age, sex, education and occupation status.

The good physical environment in the community center has allowed the implementation of a variety of activities. This is exemplified with a swim team for non-Western immigrant women age 12–70 years, where over 100 women have participated but also physical activities like Pilates/Aerobics (primarily ethnic women) and Line Dance (primarily ethnic Danish men and women) with ~25 participants in each of these teams.

Zumba teams have had good participation (30+) in women aged 14–65 years but mainly non-Western women on the team and Fitness teams with over 50 participants for both men and women with different ethnic background.

Another initiative, which has assisted in establishing a framework for physical activity and allowing residents to 'meet up' outdoors, is the establishment of a funcourt that hosts a variety of sports activities such as basketball, volleyball, football, handball and hockey. This initiative is particularly aimed at children and youngsters living in the area (Andersen, 2013).

Approximately 125 residents have every year completed a 'health check' since 2009 as a part of the offerings in the municipality. The mentioned initiatives illustrate in various way how the establishment of good physical surroundings in the local area provides a positive means of offering activities that promote local communities. In this way, the physical surroundings foster well-being and healthy habits. The overall purposes of many of the bottom-up activities have been to support the residents into obtaining a healthier life style through information and social/emotional support through participation with other residents in different physical activities. The community center and a homepage for the residents with information about the different activities have been the focal point for the improvement of trust and social network resources among the residents (Andersen and Bak, 2014). The decrease in the number of involuntarily alone residents might be the best indicator for this improvement. Researchers have demonstrated that social networks are fundamental resources in the prevention of mental and physical illness (Gele and Harslof, 2010). The results from our study are, however, difficult to compare directly with other Danish neighborhood studies. Most of them are cross-sectional, use national data or data on the municipality level and show different and contradictory results. A Norwegian study investigated various types of network resources (Gele and Harslof, 2010) and found the association between self-rated health and socioeconomic background indicators was marginally attenuated if social network indicators were added to the model. This finding is, to some extent, similar with our results. Their results also showed that close and strong friendship-based ties are important for the health of Norwegians.

A similar result was found in a Canadian study that examined the association of sociodemographic and

social capital variables with the likelihood of having core ties (friends, family), core neighborhood ties and high self-rated health (Moore *et al.*, 2011). Their results show that people with higher household income were more likely to have core ties but less likely to have core neighborhood ties. The researchers explained this finding as people having greater diversity in extra-neighborhood network capital (relationships and participation outside the neighborhood) were more likely to have core ties, and people with greater diversity in intra-neighborhood network capital (relationships and participation inside the neighborhood) were more likely to have core neighborhood ties (Moore *et al.*, 2011). Our focus is mainly on these core ties between residents and their family and friends, and the results of this article are comparable with the Canadian study (Moore *et al.*, 2011).

The results show that low income residents with a better social network also have slightly higher odds of having good self-rated health, which could possibly be explained by the diversity in the intra-neighborhood network. The results also indicates that social participation in local activities provides people with emotional support and information about healthy life style and seems to protect them from adverse effects on loneliness (Gele and Harslof, 2010).

Conventional measures of social capital may not capture these network mechanisms, and there is a need for including more relevant network variables to be able to further investigate these mechanisms. The difficulties in comparing results in this field is related to the considerable disagreement about whether social capital is a collective resource i.e. positively related to the community or whether the health benefits are associated with people and their personal networks and supports (Poortinga, 2006; Carpiano and Hystad, 2011; Moore *et al.*, 2011; Mohnen *et al.*, 2012).

There are, however, different views on whether the concept reflects the characteristics of individuals or groups, and this topic is seen by some as the most problematic methodological issue within social capital research (Portes, 1998; Brissette *et al.*, 2000; Hawe and Shiell, 2000; Moore *et al.*, 2005, 2011). This study reflects social capital on the individual level where we measure person's social network ties and social relationships.

Another important issue concerns the study designs. Most studies have used cross-sectional designs, which make it impossible to know whether people are selected or select themselves in residential areas based on their health and individual characteristics (Ellaway *et al.*, 2012). A rather limited amount of longitudinal studies have been conducted in the field of neighborhood research. Most have investigated only individual and area level exposures at single points of time in relation to health, and these studies have been conducted several years apart (Yen and Kaplan, 1998; Stafford and Marmot, 2003; Ellaway *et al.*, 2012).

STRENGTHS AND LIMITATIONS

The findings from this study should be interpreted based on the following considerations. First, this investigation is, to our knowledge, the first Danish study to repeat a survey in the same deprived neighborhood during a 5 year period, and one of the strengths is the inclusion of vulnerable residents who seldom participate in national or regional studies. In the study's time period, various health-related activities were established in the neighborhood, and they created a platform to investigate the possible health impact on various types of network resources among the residents. Social network was measured by asking about safety in the neighborhood, relationships with neighbors, participation in local activities, being involuntarily alone and how often they met with family and friends. These indicators are important aspects of a person's social network resources and primarily focus on individual-level relationships. Social capital is assumed to reflect these individual network relationships but the concept of social capital also encompasses socio-relational indicators such as trust, perceived cohesion and participation in the surrounding society; these dimensions were not investigated in this study because of the lack of relevant information in the survey.

Second, in investigating impact and change in social network resources during a 5 year time frame, the time period may be too short because the implementation of health interventions often requires a longer period and enough focus on specific target groups to impact social network resources and become pillars of the residents' daily lives. This issue could possibly explain, to some degree, the moderate results in our study.

Another important element is not only to focus on the lack of documentation of health effects (outcome) but also rather on the process and importance of the different bottom-up activities and that local health promotion and well-being activities take time. The principle of participation and involvement go hand in hand with the broad health concept. Articulating the possibility that health can also include social dimensions and a quality—of life-element. Statements from the residents indicate the importance of involving the residents in all phases of the health promotion activities. The feeling of ownership to the

project seems to have had a great impact on the participation and involvement in activities although it is important to stress that about a third of the residents are passive and not participating (Andersen and Bak, 2014).

Third, the cross-sectional design used in this study did not allow for causal inference. A moderate change in the study population from 2008 to 2013 makes it difficult to compare and analyse the results in a profound way. A limitation is the overall response-rate of 31%, which influence the representativeness of the study. Another important limitation is the lack of generalizability due to that fact that it was not possible to compare the results with data from another neighborhood. This could have provided important knowledge about e.g. similarities and differences and how the uniqueness of the observed changes in a deprived neighborhood (Korskærparken) during the 5 years period could have been explained. Finally, it is a limitation that the role of race and segregation for social participation in the neighborhood was not analysed. However, the available sample size was small, only 103 answers from residents with non-Western in 2008 and 113 answers in 2013 and this limited the possibility to analyse this dimension further.

CONCLUSION

This study has repeated a neighborhood survey and investigated whether the association between SES and self-rated health is partially explained by an improvement in social network resources (social capital) among the residents.

The results from this study must be interpreted with some caution taken our small sample and moderate statistical results into consideration.

When we take this into account and include knowledge from the completed bottom-up activities this study indicates how important it is to investigate the available network resources among the residents and that these are possible to improve over time. Our study suggest that municipalities can have great benefit of working with available social network resources among the residents in future local based health promotion projects i.e. based on citizen participation, voluntariness and local initiatives.

It is difficult to give a single explanation of the significant decrease in respondent being involuntary alone during the period from 2008 to 2013 (from 32.4% in 2008 to 20% in 2013). The increase in activities in the local community center and the increased contact in the period between residents with different cultural backgrounds could be an important part of the explanation.

A modest impact of the association between disposable income and self-rated health was found, showing that low income residents with better social network also have slightly higher odds of having good self-rated health. The results most, however, be interpreted with caution and there is a need for especially more longitudinal research in the future to explore the complex relationship between social network resources, social capital and health in neighborhoods.

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