Published in final edited form as:

Am J Prev Med. 2017 August ; 53(2): e35–e40. doi:10.1016/j.amepre.2017.01.007.

Perceived Neighborhood Social Cohesion and Preventive Healthcare Use

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Abstract

Introduction—Neighborhood social cohesion has been linked with better health and health behaviors, but its association with patterns of preventive healthcare use remains understudied. The hypothesis was that people with higher perceived neighborhood social cohesion would display increased use of preventive healthcare services.

Methods—Participants (N=7,168) were drawn from the 2006 wave of the Health and Retirement Study—a prospective and nationally representative panel study of American adults aged >50 years—and tracked for one wave (2 years). Analyses were conducted in 2016.

Results—After adjusting for sociodemographic factors and baseline health, each SD increase in neighborhood social cohesion was associated with a higher likelihood that people would obtain influenza vaccinations (OR=1.09, 95% CI=1.04, 1.15) or cholesterol tests (OR=1.10, 95% CI=1.02, 1.19). Further, women were more likely to receive mammograms/x rays (OR=1.10, 95% CI=1.01, 1.19) or Pap tests (OR=1.08, 95% CI=1.00, 1.17). However, men were not more likely to receive prostate exams (OR=1.06, 95% CI=0.96, 1.17).

Conclusions—With additional research, findings from this study may inform the development of new strategies that increase the use of preventive healthcare services and enhance the quality of life among people moving through the ranks of this aging society.

INTRODUCTION

Three factors converge to highlight the importance of preventive healthcare use among older U.S. adults. The first is population aging: People aged >65 years currently represent 13.7% of the population, and in the next 10 years that percentage is projected to increase by nearly 50%.¹ Secondly, the cost of medical care is rising: The Congressional Budget office projects that spending on Medicare alone will nearly double as a share of gross domestic product, from 3.7% in 2012 to 7.3% by 2050.² Thirdly, the underuse of preventive services among

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No financial disclosures were reported by the authors of this paper.

older adults remains an issue: Less than 30% of adults aged 50–64 years and less than 50% of adults aged >65 years are up to date with core preventive services.^{3,4} If preventive healthcare service use is increased, the rising cost of health care could be offset and health could be enhanced. Thus, a key challenge is to identify factors that increase the likelihood of preventive healthcare service use.

However, the main strategies for enhancing preventive healthcare use has been aimed at individuals. Though important, emphasis on individuals diverts focus away from higher-order factors, such as social networks and neighborhood-level factors. A growing body of research suggests that neighborhood characteristics impact a wide range of health behaviors and outcomes.^{5–16} However, research in this area has historically emphasized the impact of negative neighborhood characteristics (e.g., violence, density of fast food restaurants, noise, traffic, poor air quality, vandalism, drug use, and physical decay) on worsening health.^{17,18} Fewer studies have examined the role that positive neighborhood characteristics, such as neighborhood social cohesion, play in enhancing health.

Neighborhood social cohesion can be defined as the perceived degree of connection among neighbors, and people's willingness to intervene for the common good.¹⁹ The construct is also characterized by the degree to which residents feel they belong to the area, and the degree of trust that is shared among neighbors. Neighborhood social cohesion is distinct from individual-level social networks and support because it characterizes the entire community and impacts the whole neighborhood, regardless of an individual's characteristics.^{11,20} In some studies, neighborhood social cohesion is examined at the aggregated neighborhood level using multilevel modeling. However, this requires a nested study design with many residents clustered in many neighborhoods, which was not available in this sample. Therefore, this study focuses on people's perceptions of neighborhood social cohesion at the individual level.

A growing body of research shows that neighborhood social cohesion is associated with a range of enhanced health outcomes including reduced risk of stroke, cardiovascular events, and mortality.^{5–10} Furthermore, a growing number of studies have linked neighborhood social cohesion with intermediate behavioral outcomes such as increased physical activity,^{12–14} increased number of smoking quit attempts, and increased smoking cessation.^{15,16} The theoretic orientation of this study is informed by the social ecologic model, which in turn emerged from developments in several fields, including community psychology, urban sociology, and public health.²¹ In brief, the model asserts that the health of individuals is shaped by multiple contexts, extending outward from the micro-context (the family and peer networks), to the meso-level context (neighborhoods and workplaces), and the macro-level context (economic structures and societal institutions). Within this framework, individuals' lives are embedded in their residential neighborhoods, and their health status—including preventive service behaviors—are shaped by the reciprocal interactions between their personal characteristics and contextual forces (including the level of social cohesion).²² Although the precise details vary according to the field, they all agree that multiple levels of influence operate to shape people's behaviors.

Based on this framework, there are four hypothesized mechanisms through which higher neighborhood social cohesion may promote the uptake of preventive health services^{9,11}:

1. increased diffusion of information about preventive services (e.g., cohesive neighborhoods can more easily increase the dissemination of information about where to acquire affordable influenza vaccinations);
2. social and psychological support (e.g., cohesive neighbors are more likely to provide emotional support; if a person is anxious about receiving a cancer screening, a neighbor will more likely listen to and discuss the concerns);
3. collective ability to advocate for resources (cohesive neighborhoods are more likely to organize and lobby for medical navigators who can help patients understand the preventive services they are receiving, and also assist people to adhere to health maintenance measures); and
4. maintenance of healthy norms through informal social control (e.g., cohesive neighborhoods can more easily reinforce the norm that acquiring appropriate preventive health services is both desirable and the norm).

The aim of this study was to test whether higher perceived neighborhood social cohesion was prospectively associated with increased use of preventive healthcare services. The hypothesis was that even after adjusting for traditional demographic covariates and baseline health, the association between higher perceived neighborhood social cohesion and increased use of preventive health services would persist.

METHODS

Study Sample

The Health and Retirement Study (HRS) is an ongoing and nationally representative panel study of U.S. adults aged 50 years. Since its inception in 1992, it has interviewed respondents every 2 years.²³ The HRS is sponsored by the National Institute on Aging and is conducted by the University of Michigan's Institute for Social Research. Starting in 2006, a random 50% of HRS respondents were assigned to undergo an enhanced face-to-face interview. At the end of the interview, respondents were given a psychosocial questionnaire, which they completed and returned by mail to the HRS investigators. Among those interviewed, the leave-behind questionnaire response rate was 90%, resulting in a final sample of 7,168 respondents. HRS provides extensive documentation about their protocol, instrumentation, and complex sampling strategy elsewhere (<http://hrsonline.isr.umich.edu/>). HRS has been approved by several ethics committees, including University of Michigan IRB. Further, informed consent was obtained from all HRS respondents.

Measures

Perceived neighborhood social cohesion was assessed using a four-item scale that was developed and tested for use in two nationally representative studies of older adults (HRS and the English Longitudinal Study of Aging).²⁴ The four items were derived from widely used neighborhood social cohesion scales that have been validated.^{12,25–27} The scale assesses the respondent's perceived level of social cohesion and social trust of his or her

neighborhood. Using a 7-point Likert scale, respondents indicated the degree to which they endorsed the following four items: *I really feel part of this area*, *If you were in trouble, there are lots of people in this area who would help you*, *Most people in this area can be trusted*, and *Most people in this area are friendly*. The scores on each item were then averaged together, with higher scores reflecting higher perceived neighborhood social cohesion (Cronbach's $\alpha=0.83$). The scores were then standardized (mean, 0; SD=1) so that the outcome OR can be interpreted as the result of a 1-SD increase in perceived neighborhood social cohesion.

To identify primary prevention visits, the number of respondents in the analyses changed depending on which preventive service was examined. For example, the prostate exam analyses used only data from men with no history of cancer and the mammogram analyses used only data from women with no history of cancer. Sensitivity analyses comparing models with and without adjustment for the relevant disease (e.g., including and excluding men with a history of cancer in the prostate exam analyses) indicated stronger associations than the ones reported in this study; thus, the reported findings in this study are a conservative estimate.

The outcome preventive healthcare use measures were obtained in 2008, which is the follow-up wave directly after baseline. Each respondent was asked gender-specific questions regarding use (*yes/no*) of preventive healthcare services over the last 2 years (between the 2006 and 2008 waves). In this wave, HRS asked about five preventive measures recommended by either the U.S. Preventive Services Task Force or the Centers for Disease Control and Prevention. Respondents were asked: *In the last two years, have you had any of the following medical tests or procedures: A flu shot? A blood test for cholesterol? A mammogram or x ray of the breast to search for cancer? A Pap smear? An examination of your prostate to screen for cancer?* The HRS preventive measures have been previously evaluated by benchmarking them against other national surveys and they demonstrate high reliability and validity.²⁸

All covariates were assessed at the baseline wave in 2006. Sociodemographic factors included: age, gender (male/female), race/ethnicity (white, African American, Hispanic, other), marital status (married/not married), educational attainment (no degree, high school diploma or GED, college degree or higher), total wealth (<\$25,000, \$25,000–124,999, \$125,000–299,999, \$300,000–649,999, >\$650,000—based on quintiles of the score distribution in this sample), and health insurance (yes/no).

Baseline health factors included an index of eight major chronic illnesses, which consisted of self-reported doctor's diagnosis on eight major medical conditions, including:

1. high blood pressure;
2. diabetes;
3. lung disease;
4. cancer or malignant tumor of any kind (excluding minor skin cancer);

5. heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems;
6. stroke;
7. emotional, nervous, or psychiatric problems; and
8. arthritis or rheumatism.

This self-reported health measure has been rigorously assessed for its validity and reliability in HRS.²⁹

Statistical Analysis

Logistic regression was used in all of the analyses and all results can be interpreted as the change in odds of obtaining a preventive service as a function of a 1-SD increase in neighborhood social cohesion. Three covariate models were used to test the main hypothesis. Model 1, the age-adjusted model, adjusted for only age. Model 2, the sociodemographic model, adjusted for age, gender, race/ethnicity, marital status, education level, total wealth, and insurance status. Model 3 adjusted for all of the sociodemographics factors and baseline health (an index of eight major chronic illnesses). Further, a sensitivity analysis was performed by re-examining the association between perceived neighborhood social cohesion and preventive doctor visits after removing all respondents who had moved (any distance) between baseline and follow-up. The motivation for this sensitivity analysis is that when people move to a new location, the exposure—level of neighborhood social cohesion—may change from one neighborhood to the next. All analyses were conducted in 2016.

In this study, the overall item non-response rate for all study variables was 2.54%. However, missing data were scattered across many variables. Thus, when a complete case analysis (i.e., using data only from respondents with complete data on all variables) was performed, it resulted in a 10.16%–34.60% loss of respondents, depending on which analysis was run. Hence, to obtain less biased estimates, multiple imputation procedures were used to impute missing data, because so doing provides a more accurate estimate of association than other methods of handling missing data.³⁰ The multiple imputation multivariate normal command in Stata, version 14 was used to create ten data sets. A missing at random mechanism for the missing values was assumed, and accordingly, an inclusive as opposed to a restrictive use of auxiliary items for each variable with missing data was used.^{30,31}

RESULTS

The average age of respondents at baseline was 69 (SD=10) years. The majority of respondents were women (58%), married (65%), and reported having an average of two major chronic conditions (out of a possible eight). Most had a high school degree (55%) or attended some college (26%). Respondents identified as being white (78%), African American (13%), Hispanic (7%), or other (1%).

In the sociodemographic models (Table 2)—that adjusted for age, race/ethnicity, marital status, education level, total wealth, and insurance status—people who reported higher

perceived neighborhood social cohesion had a higher likelihood of obtaining a preventive influenza vaccination (OR=1.06, 95% CI=1.01, 1.12). Further, women reporting higher neighborhood social cohesion were more likely to obtain a mammogram/x ray (OR=1.08, 95% CI=1.00, 1.17) or Pap test (OR=1.09, 95% CI=1.01, 1.17). However, men reporting higher neighborhood social cohesion were not more likely to obtain a prostate exam, although the data were suggestive of a positive association (OR=1.05, 95% CI=0.95, 1.16). Further, the association between higher neighborhood social cohesion and cholesterol tests was marginally significant (OR=1.07, 95% CI=0.99, 1.01). In models that adjusted for all of the sociodemographic factors and baseline health, the outcomes were largely similar (Table 2) except an association between neighborhood social cohesion and cholesterol tests emerged (OR=1.10, 95% CI=1.02, 1.19). In minimally adjusted models that controlled only for age, the results were largely the same except the strength of associations were stronger; further, an association between neighborhood social cohesion and prostate exams emerged (OR=1.15, 95% CI=1.05, 1.26) (Table 2).

An additional analysis was run that removed any people who moved between the baseline and follow-up wave of data collection (approximately 11% of the sample). In models that adjusted for sociodemographic factors, the results largely mirrored analyses that were run on the full sample (Appendix Table 1), except the association between neighborhood social cohesion and preventive influenza vaccinations became marginally insignificant (OR=1.04, 95% CI=0.98, 1.10).

DISCUSSION

In a nationally representative sample of U.S. adults aged 50 years, higher perceived neighborhood social cohesion was associated with increased use of influenza vaccinations, cholesterol tests, mammograms, and Pap tests, but not prostate screenings. This is among the first studies to demonstrate associations between neighborhood social cohesion and use of preventive health care. However, the study results are consistent with previous studies that find that higher neighborhood social cohesion is associated with healthier behaviors including increased physical activity,^{12–14} increased number of smoking quit attempts, and increased smoking cessation.^{15,16} Further, this study's results align with the two studies that have examined the association between neighborhood social cohesion and use of preventive health services. For example, one study was conducted among a cross-sectional sample of 2,586 black women in the Philadelphia area.³² The researchers found that higher neighborhood social capital and cohesion was associated with increased use of mammograms. Another cross-sectional study included 639 parents. The parents in the study who reported higher neighborhood social capital were more likely to vaccinate their children against H1N1.³³

Higher neighborhood social cohesion was not associated with higher likelihood of receiving a prostate screening—although the association was suggestive (OR=1.06, 95% CI=0.96, 1.17). It is unclear why this lack of an association existed, even though higher neighborhood social cohesion was associated with higher use of the other four preventive behaviors (influenza vaccinations, cholesterol tests, mammograms, and Pap tests). One possible explanation is the wording of the prostate screening question. It asked, *In the last 2 years,*

have you had any of the following medical tests or procedures...an examination of your prostate to screen for cancer? Two tests are commonly used to screen for prostate cancer, including the prostate specific antigen test and the digital rectal exam, yet this question did not differentiate between them. This is an important caveat to consider because the initiation of digital rectal exams is driven mainly by factors that influence the physician's behavior (who may live in a different neighborhood) rather than factors that influence the patient's behavior. On the other hand, patients are encouraged to actively seek out and discuss prostate specific antigen screenings. Thus, the hypothesized association between neighborhood social cohesion and prostate exam screening is likely diluted because both types of prostate screening tests are captured by the broadly worded question. Future research should further examine this potential null association.

Limitations

This study had several limitations. Reverse causation is possible if underlying health conditions influence a person's perceived level of neighborhood social cohesion. However, sensitivity analyses and adjustment for chronic health conditions helped minimize this concern. Further, residual confounding by unmeasured variables is always a limitation in observational research. However, findings were maintained across careful control for multiple sociodemographic variables and baseline health. Although hypothesized mechanisms that link higher neighborhood social cohesion with increased use of preventive health services exist (as outlined in the Introduction), the data set used in this study did not have the variables necessary to test these hypotheses. For example, to test whether diffusion of information is a potential mechanism, survey data about the various sources from which respondents obtained information about cancer screening would be needed. Future research should investigate this important topic using data sets that allow for social network and sociometric analyses. This study also has a number of considerable strengths. The data used for this study came from a large and richly characterized cohort, which is prospective, and nationally representative of U.S. adults aged 50 years. The potential impact of missing was reduced by using the multiple imputation technique, which provides more accurate estimates of associations than other methods of handling missing data.³⁰

CONCLUSIONS

Although important, targeting interventions at the individual level diverts focus and responsibility away from stressors and resilience factors originating at higher levels, such as the neighborhood level. A growing body of research shows that higher neighborhood social cohesion is associated with a range of health behaviors and outcomes. If basic research in this area continues documenting promising results, a plausible next step would be to initiate projects that examine the potential health benefits of policy and public health interventions that bolster the social infrastructure and cohesion of neighborhoods. Findings from such studies may forge novel, scalable, and effective methods that increase the use of preventive healthcare services, offset the burden of rising healthcare costs, and enhance the quality of life among people moving through the ranks of this aging society.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

This work was supported by the National Heart, Lung, and Blood Institute (T32 HL 098048). The Health and Retirement Study is run by the Institute for Social Research, University of Michigan, and funded by the National Institute on Aging (U01 AG009740).

Eric Kim had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis; both authors contributed to the study concept and design; both authors contributed to acquisition, analysis, or interpretation of data; both authors contributed to drafting the manuscript; and both authors contributed to critical revision of the manuscript for important intellectual content.

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Table 1Descriptive Statistics^a

Mean neighborhood social cohesion score (SD)	5.49 (1.36)
Mean age (SD)	69.06 (9.84)
Female	4,139 (57.74)
Race/Ethnicity	
White	5,607 (78.22)
African-American	936 (13.06)
Hispanic	527 (7.35)
Other	98 (1.37)
Married status	4,639 (64.72)
Education	
<High school	1,366 (19.06)
High school	3,952 (55.13)
College	1,850 (25.81)
Total wealth	
1st quintile	1,437 (20.05)
2nd quintile	1,431 (19.96)
3rd quintile	1,436 (20.03)
4th quintile	1,431 (19.96)
5th quintile	1,434 (19.99)
Mean # of chronic illnesses (SD)	2.11 (1.43)
Smoking status	
Never	3,114 (43.45)
Former smoker	3,147 (43.90)
Current smoker	907 (12.65)
Exercise	
Never	1,405 (19.60)
1–4 times per month	1,505 (21.00)
More than 1× per week	4,258 (59.39)
Alcohol frequency (days/week)	
Never	3,486 (48.63)
<1	1,300 (18.14)
1–2	1,134 (15.82)
3+	1,248 (17.40)
Insured	6,850 (95.57)

^aUnless otherwise noted, values are number of participants (percentage)

Table 2

ORs for the Association Between Perceived Neighborhood Social Cohesion and Preventive Healthcare Services

Health service measure	Age AOR (95% CI)	Sociodemographic ^e AOR (95% CI)	Sociodemographic ^e + Baseline Health ^f AOR (95% CI)	Prevalence
Preventive flu shot ^a	1.14 (1.09– 1.20)	1.06 (1.01–1.12)	1.09 (1.04–1.15)	64.77%
Cholesterol test ^b	1.16 (1.08– 1.26)	1.07 (0.99–1.01)	1.10 (1.02–1.19)	80.87%
Mammogram/X-ray ^c	1.16 (1.08– 1.25)	1.08 (1.00–1.17)	1.10 (1.01–1.19)	70.73%
Pap smear ^c	1.12 (1.04– 1.20)	1.09 (1.01–1.17)	1.08 (1.00–1.17)	47.63%
Prostate exam ^d	1.15 (1.05– 1.26)	1.05 (0.95–1.16)	1.06 (0.96–1.17)	68.67%

Note: Boldface indicates statistical significance ($p < 0.05$).

^a n=7,168

^b Only people with no history of heart disease or stroke (n=5,161)

^c Only women with no history of cancer (n=3,535)

^d Only men with no history of cancer (n=2,534)

^e Sociodemographic factors: age, race/ethnicity, marital status, education level, total wealth, insurance status

^f Baseline Health factors: index of eight major chronic illnesses