Sense of community and mental health: a cross-sectional analysis from a household survey in Wisconsin

Eunice Y Park [ID] ,[1,2] Thomas R Oliver,[3] Paul E Peppard [ID] ,[3] Kristen C Malecki [ID] [4]

[1]University of Wisconsin Population Health Institute, University of Wisconsin-Madison, Madison, Wisconsin, USA
[2]Department of Public Health, College for Community Health, Montclair State University, Montclair, New Jersey, USA
[3]Department of Population Health Sciences, University of Wisconsin Madison School of Medicine and Public Health, Madison, Wisconsin, USA
[4]Environmental and Occupational Health Sciences, University of Wisconsin-Madison School of Medicine and Public Health, Chicago, Illinois, USA

Correspondence to
Dr Eunice Y Park;
parke@montclair.edu

ABSTRACT

Background In the USA, one in five adults live with a mental illness, and researchers have estimated that nearly half of the population will have a mental illness over the course of their lifetime. Research has shown significant associations between social relationships and mental health outcomes at the individual and population levels. This study aims to examine whether sense of community, a type of social capital, is associated with mental health.

Methods In a cross-sectional analysis, multiple logistic regression models were used to examine whether sense of community was associated with symptoms of depression, anxiety and stress reported over the last week. The analysis used data from the Survey of the Health of Wisconsin collected between 2014 and 2016. A total of 1647 observations are included in the analyses.

Results Compared with those who report a positive sense of community, those with a negative sense of community had a significantly higher odds of reporting depression, anxiety and stress symptoms. Socioeconomic status is negatively associated with depression and anxiety, but not with stress. Women were more likely to experience moderate, severe, or extremely severe anxiety and stress, compared with men.

Conclusion This study extends current understanding of health benefits of social capital and found that individuals' sense of community is associated with reduced symptoms of depression, anxiety and stress. Further research examining mechanisms to support improved sense of community and other types of social capital could benefit health equity research.

INTRODUCTION

According to the National Institute of Mental Health, 57.8 million or one in five American adults live with a mental illness in 2021,[1] and researchers have estimated that nearly half of the population will have a mental illness over the course of their lifetime.[2] In 2019, 8.1% of adults had anxiety disorder symptoms and 6.5% had symptoms of depressive disorders, which are the two most common mental illnesses.[3] While predisposing and more proximal factors in the development of mental illness are complex, there is good evidence that the quantity and quality of one's social relationships can play a role.

WHAT IS ALREADY KNOWN ON THIS TOPIC
⇒ This study expands beyond prior research to examine the relationship between sense of community and mental health in the general population. Social capital is one of several related phenomena that researchers have asserted influence general health and mental well-being. There are many types and measures of social capital, however. The relationship between sense of community, one type of social capital and mental health outcomes has been demonstrated in very specific subpopulations.

WHAT THIS STUDY ADDS
⇒ In this study, we find that individuals reporting a higher sense of community in their neighbourhoods reported less symptoms of depression, anxiety and stress. This suggests that incorporating information on social relationships can strengthen the capacity of health surveys to link social factors to important health conditions.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY
⇒ Findings of statistically significant associations between sense of community and symptoms of depression, anxiety and stress can be a foundation for adding new measures of social capital into future studies and investigating a wider range of health outcomes.

An extensive field of study shows significant associations between social relationships and health outcomes at the individual and population levels. Previous research has employed a variety of constructs and operational measures, including social capital,[4–7] social support,[8 9] social ties,[10] social network,[11] social cohesion[12] and social participation.[13] The Centers for Disease Control and Prevention identifies loneliness and social isolation as public health risks, specifically for adults aged 50 and older.[14]

This study focuses on social capital. While there is no one definition of social capital, the core idea is that the social relationships of individuals function as resources that affect different dimensions of their well-being.

We build on the approach of Perkins and Long,[15] who identify four types of social capital based on whether it is present in cognition or actual behaviour, and whether it operates through formal or informal organisations.[15]

In particular, we focus on one type of social capital, which Perkins and Long label as 'Sense of Community'.[15] In their typology, sense of community is based on individuals' perceptions of informal organisation and relationships. They follow the seminal work of McMillan and Chavis,[16] who define sense of community as 'a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together'.[16] McMillan and Chavis operationalised sense of community as a composite measure of four dimensions: (1) needs fulfilment (a perception that members' needs will be met by the community); (2) group membership (a feeling of belonging or a sense of interpersonal relatedness); (3) influence (a sense that one matters, or can make a difference, in a community and that the community matters to its members) and (4) emotional connection (a feeling of attachment or bonding rooted in members' shared history, place or experience).[16]

The cognitive and emotional aspects of sense of community make this type of social capital especially relevant for mental health outcomes. Leading scholars in social epidemiology have suggested the importance of such analysis, arguing that being integrated into a social network may produce positive psychological states like a sense of purpose, belonging, security and self-worth.[17 18] Beyond promoting mental health, one's sense of community may also serve as a buffer to protect mental health in the face of adverse or challenging life events. Some studies have explored the relationship between sense of community and mental health in very specific subpopulations such as military spouses[19] and persons with psychiatric disabilities.[20]

The purpose of the study is to examine whether there is an association between sense of community and mental health in the general population. It tests the hypothesis that one's sense of community is negatively associated with common symptoms of mental illness including depression, anxiety and stress. It examines these associations in a population-based study of adults living across geographically diverse urban and rural communities. The analysis is based on self-reported measures from a well-established household survey in Wisconsin, as detailed in the sections below.

METHODS
Study sample
This study sample includes adult participants from the Survey of the Health of Wisconsin (SHOW) between 2014 and 2016. SHOW is a comprehensive household-based health examination survey collecting data on demographics, health history, self-reported health, quality of life, health behaviours, access to care, insurance, caregiving and cognitive function.[21] The 2014–2016 includes a triennial randomly selected population representative of Wisconsin's adult civilian, non-institutionalised population. A three-stage sampling design with counties stratified by state health regions, demographics and poverty is the primary sampling unit. Milwaukee and Dane counties are selected due to their large size relative to all 72 Wisconsin counties; 10 counties in total are selected for visits in 11 stands (one stand per county except for two stands in Milwaukee County). Within each selected county, the secondary and tertiary sampling units in 2014–2016 were Census 2010 block groups and households within each census block chosen group. Combining all 3 years of data collection, the sample is intended to be geographically and demographically representative of the state of Wisconsin (Details on sampling methods can be found here: https://show.wisc.edu/data/survey-methods/). Among the 1957 adults who participated in the 2014–2016 survey, 1647 had complete case data for the predictor measure of interest.

Sense of community
The primary predictor used in this analyses is a measure of sense of community derived from the eight-item Brief Sense of Community Scale developed by Peterson *et al*,[22] based on the work of McMillan and Chavis[16] (see online supplemental appendix A). The eight items ask survey respondents to report how their neighbourhood allows them to fulfil needs, exert influence, achieve a sense of belonging and develop emotional bonds with others. The participants answer according to a five-point Likert scale: 'strongly agree (1)', 'agree (2)', 'neutral (3)', 'disagree (4)' and 'strongly disagree (5)'. The composite measure is derived by averaging the responses to the eight questions. Because very few respondents reported strong agreement (n=15) or strong disagreement (n=3), we grouped respondents based on a three-point categorical variable: a 'positive sense of community (score range: 1–2.5)', 'neutral (score range: 2.5–3.5)' and a 'negative sense of community (score range: 3.5–5)'.

Symptoms of mental illness
To assess mental health, we use symptoms of depression, anxiety and stress—these conditions being the most common mental health-related diagnoses. The measures in SHOW are based on the Depression Anxiety Stress Scale (DASS), a self-administered questionnaire created by Lovibond and Lovibond.[23] The 2014–2016 survey uses the DASS-21, a subset of the original survey adopted by Henry and Crawford,[24] which has seven questions per section: depression (low positive affectivity), anxiety (physiological hyperarousal) and stress (negative affectivity). Validity[25] and reliability[26 27] of DASS-21 have been established for many languages and in diverse cultural settings over the past couple of decades. It is important to note two things

about DASS-21. First, it was not created as a diagnostic test. Second, it specifies the past week as a reference in considering these questions.

Composite scores within each domain of depression, anxiety and stress were calculated for the respondents who answered all of the items (see online supplemental appendix B). Answers were scored on a Likert scale ranging from 0 to 3 with the following descriptors: 0 (did not apply to me at all), 1 (applied to me to some degree, or some of the time), 2 (applied to me to a considerable degree or a good part of time) or 3 (applied to me very much, or most of the time). The composite measures of depression, anxiety and stress are summed scores for each item and range from 0 to 21. For interpretation, this number is multiplied by two to correspond with the original cut-off points suggested by Lovibond and Lovibond[23] for normal, mild, moderate, severe and extremely severe conditions (see online supplemental appendix B).[23] This study uses the suggested cut-off points to create a binary variable by grouping normal (ie, no symptoms or little symptoms below the threshold for being classified as mild) and mild (0) and moderate, severe, and extremely severe symptoms (1). This allows for logistic regression to discriminate between mild and more serious conditions.

Covariates

The analyses controlled for several key covariates widely used in previous research using SHOW data (see online supplemental appendix C).[28–30] For demographic factors, we included age in six categories ranging from 18 to 98; gender categorised into female and male; and race and ethnicity categorised into non-Hispanic white alone and non-white, which includes non-Hispanic Black or African American (alone or in combination), Hispanic (any race) and Non-Hispanic other or multiracial (not Black or African American). For socioeconomic factors, we included educational attainment in five categories: less than high school degree, high school or equivalent, some college, associate's degree and bachelor's degree or above, as well as annual household income in five categories. We also included the urbanised areas and urban cluster classification codes from the 2010 Census, which were used to control the urbanicity and rurality of the residential area: urban and rural.

Statistical analysis

All statistical analyses were undertaken in SAS Studio V.3.8 with survey procedures to account for the intricate sampling design of SHOW. All analyses accounted for the SHOW survey design and population weights. We developed crude and adjusted logistic regression models to test the association between sense of community and each symptoms of mental illness measure. Adjusted models account for individual-level demographic and socioeconomic characteristics of age, gender, race and ethnicity, educational attainment, income, and residential area.

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

RESULTS

The characteristics of the 1674 participants are presented in table 1. For sense of community, the average response for all eight items on a five-point scale is 0.7% for 'strongly agree', 17.5 for 'agree', 60.1% for 'neutral', 21.7% for 'disagree', and 0.2% for 'strongly disagree'. For the consolidated three-point scale, the average response for all eight items is 42.4% (n=757) for a 'positive sense of community', 46.4% (n=742) for 'neutral' and 11.2% (n=175) for a 'negative sense of community'. For symptoms of mental illness, 12.4% report symptoms of moderate, severe or extremely severe symptoms of depression while 87.6% do not; 11.8% of respondents report symptoms of moderate, severe or extremely severe symptoms of anxiety while 88.2% do not; and 7.5% of respondents report symptoms of moderate, severe or extremely severe symptoms of stress while 92.5% do not.

The results of the multiple logistic regression models presenting ORs for moderate, severe and extremely severe symptoms of depression, anxiety and stress by levels of sense of community as well as included covariates are presented in table 2. The crude model shows a highly significant negative association between sense of community and depression (p<0.001). Compared with individuals with a positive sense of community, those with a neutral sense of community were 2.2 times more likely (OR 2.2, 95% CI 1.5 to 3.2, p<0.001) and those with a negative sense of community were 5.0 times more likely (OR 5.0, 95% CI 3.2 to 7.9, p<0.001), to report moderate, severe or extremely severe symptoms of depression. A significant negative association remains after adjusting for the demographic and socioeconomic covariates (p<0.001). Compared with individuals with a positive sense of community, those with a neutral sense of community were 1.8 times more likely (OR 1.8, 95% CI 1.3 to 2.5, p=0.002), and those with a negative sense of community were 3.2 times more likely (OR 3.2, 95% CI 2.0 to 5.1, p<0.001), to report moderate, severe or extremely severe symptoms of depression. Several covariates were associated with depression, including age (p<0.001) and income (p=0.024). Age is associated with depression. Specifically, compared with those who were 18–34 years of age, those who were 65–74 years of age (OR 0.3, 95% CI 0.2 to 0.6, p<0.001) and older than 74 years of age (OR 0.3, 95% CI 0.1 to 0.5, p<0.001) are 70% less likely to experience symptoms of depression.

For anxiety, the crude model shows a highly significant negative association between sense of community and moderate, severe or extremely severe symptoms of anxiety. Compared with individuals with a positive sense of community, those with a neutral sense of community were 1.9 times more likely (OR 1.9, 95% CI 1.6 to 2.4,

Table 1 Characteristics of the sample, SHOW 2014–2016

	Positive sense of community, n (%)	Neutral sense of community, n (%)	Negative sense of community, n (%)	Total, n (%)
Age				
18–34	82 (10.8)	186 (25.1)	68 (39.9)	336 (20.1)
35–44	107 (14.1)	117 (15.8)	33 (18.9)	257 (15.4)
45–54	117 (15.4)	125 (16.8)	19 (10.9)	261 (16.0)
55–64	173 (22.9)	146 (19.7)	29 (16.6)	348 (20.8)
65–74	173 (22.9)	102 (13.7)	21 (12.0)	296 (17.7)
>74	105 (13.9)	66 (8.9)	5 (2.9)	176 (10.5)
Missing	0	0	0	0
Gender				
Male	328 (43.3)	337 (45.4)	70 (40.0)	735 (43.9)
Female	429 (56.7)	405 (54.6)	105 (60.0)	939 (56.1)
Missing	0	0	0	0
Race and ethnicity				
Non-Hispanic white alone	681 (90.1)	639 (86.1)	114 (65.5)	1434 (85.8)
Non-white	75 (9.9)	103 (13.9)	60 (34.5)	238 (14.2)
Missing	1	0	1	2
Marital status				
Married	519 (68.7)	452 (60.9)	81 (46.3)	1052 (62.9)
Divorced, separated or widowed	159 (21.1)	109 (14.7)	29 (16.6)	297 (17.8)
Single or living with partner	77 (10.2)	181 (24.4)	65 (37.1)	323 (19.3)
Missing	2	0	0	2
Educational attainment				
<High school degree	33 (4.4)	52 (7.0)	14 (8.0)	99 (5.9)
High school or equivalent	124 (16.4)	148 (20.0)	38 (21.7)	310 (18.5)
Some college	131 (17.3)	135 (18.2)	55 (31.4)	321 (19.2)
Associate degree	125 (16.5)	137 (18.5)	29 (16.6)	291 (17.4)
Bachelor's degree or above	343 (45.4)	269 (36.3)	39 (22.3)	651 (38.9)
Missing	1	1	0	0
Income				
<US$20 000	63 (8.7)	92 (13.0)	36 (21.8)	191 (11.9)
US$20 000–US$34 999	94 (12.9)	126 (17.8)	45 (27.3)	265 (16.6)
US$35 000–US$49 999	98 (13.5)	99 (14.0)	20 (12.1)	217 (13.6)
US$50 000–US$74 999	175 (24.1)	153 (21.6)	30 (18.2)	358 (22.4)
>$75 000	297 (40.9)	238 (33.6)	34 (20.6)	569 (35.6)
Missing	30	34	10	74
Total	727	708	165	1600
Residential area				
Urban	479	506	134	1119
Rural	278	236	41	555
Missing	0	0	0	0

SHOW, Survey of the Health of Wisconsin.

p<0.001) and those with a negative sense of community were 4.4 times more likely (OR 4.4, 95% CI 2.5 to 7.7, p<0.001), to report moderate, severe or extremely severe symptoms of anxiety. A significant negative association remains after adjusting for the demographic and socioeconomic covariates. Compared with individuals with a positive sense of community, those with a neutral sense of community were 1.7 times more likely (OR 1.7, 95% CI 1.2 to 2.3, p=0.003), and those with a negative sense of community were 2.7 times more likely (OR 2.7,

Table 2 Results for the multiple logistic regression models for the odds of reported symptoms of moderate, severe and extremely severe symptoms of depression, anxiety and stress

	Depression		Anxiety		Stress	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Sense of community						
Positive sense of community	Reference		Reference		Reference	
Neutral	1.79 (1.26 to 2.52)	0.002	1.66 (1.20 to 2.30)	0.003	1.24 (0.77 to 2.00)	0.38
Negative sense of community	3.18 (1.98 to 5.10)	<0.001	2.71 (1.59 to 4.63)	<0.001	2.76 (1.75 to 4.35)	<0.001
Age						
18–34	Reference		Reference		Reference	
35–44	1.06 (0.66 to 1.71)	0.81	1.67 (0.98 to 2.83)	0.059	1.07 (0.69 to 1.65)	0.77
45–54	1.04 (0.65 to 1.64)	0.88	0.77 (0.33 to 1.77)	0.52	0.92 (0.50 to 1.70)	0.79
55–64	0.79 (0.47 to 1.33)	0.37	0.98 (0.59 to 1.61)	0.93	0.52 (0.21 to 1.27)	0.146
65–74	0.33 (0.18 to 0.59)	<0.001	0.71 (0.34 to 1.47)	0.34	0.14 (0.05 to 0.37)	<0.001
>74	0.26 (0.15 to 0.48)	<0.001	0.85 (0.35 to 2.04)	0.70	0.12 (0.02 to 0.57)	0.009
Gender (ref=male)						
Female	1.50 (0.95 to 2.39)	0.084	1.77 (1.11 to 2.80)	0.017	1.98 (1.05 to 3.72)	0.035
Race and ethnicity (ref=non-Hispanic white)						
Non-white	1.05 (0.72 to 1.53)	0.79	0.88 (0.56 to 1.39)	0.58	1.04 (0.63 to 1.70)	0.89
Marital status						
Married	Reference		Reference		Reference	
Divorced, separated or widowed	1.14 (0.61 to 2.15)	0.67	1.15 (0.69 to 1.92)	0.59	0.56 (0.22 to 1.47)	0.23
Single or living with partner	1.47 (0.88 to 2.44)	0.137	1.42 (0.71 to 2.83)	0.31	1.00 (0.51 to 1.99)	0.99
Educational attainment						
<High school degree	Reference		Reference		Reference	
High school or equivalent	0.66 (0.44 to 1.00)	0.049	0.46 (0.23 to 0.90)	0.024	1.17 (0.43 to 3.22)	0.76
Some college	0.60 (0.32 to 1.12)	0.103	0.49 (0.21 to 1.16)	0.102	1.17 (0.35 to 3.98)	0.79
Associate degree	0.55 (0.34 to 0.88)	0.014	0.52 (0.26 to 1.06)	0.070	0.92 (0.23 to 3.66)	0.90
Bachelor's degree or above	0.41 (0.21 to 0.82)	0.013	0.27 (0.16 to 0.45)	<0.001	0.71 (0.26 to 1.97)	0.50
Income						
<US$20 000	Reference		Reference		Reference	
US$20 000–US$34 999	1.24 (0.58 to 2.67)	0.57	0.98 (0.54 to 1.77)	0.95	1.14 (0.62 to 2.08)	0.67
US$35 000–US$49 999	1.63 (0.94 to 2.81)	0.08	0.75 (0.38 to 1.48)	0.40	1.32 (0.61 to 2.83)	0.47
US$50 000–US$74 999	0.96 (0.53 to 1.72)	0.88	0.53 (0.33 to 0.86)	0.011	0.52 (0.23 to 1.18)	0.113
>US$75 000	0.75 (0.37 to 1.54)	0.43	0.56 (0.26 to 1.19)	0.129	0.67 (0.32 to 1.39)	0.27
Residential area (ref=rural)						
Urban	1.18 (0.87 to 1.59)	0.29	1.01 (0.66 to 1.55)	0.97	1.34 (0.83 to 2.16)	0.22

95% CI 1.6 to 4.6, p<0.001) to report moderate, severe or extremely severe symptoms of anxiety. Several covariates were associated with anxiety, including age (p=0.008), gender (p=0.017), educational attainment (p<0.001) and income (p=0.04). Overall, age is associated with symptoms of anxiety, although specific age groups indicate different trends. Compared with men, women are 1.8 times more likely to experience anxiety (OR 1.8, 95% CI 1.1 to 2.8, p=0.017). Education and income are both negatively associated with experiencing greater anxiety symptoms.

Similar to both depression and anxiety, the crude model shows a highly significant negative association between one's sense of community and symptoms of moderate, severe or extremely severe stress. Compared with individuals with a positive sense of community, those with a neutral sense of community were 1.6 times more likely (OR 1.6, 95% CI 1.0 to 2.7, p=0.052) and those with a negative sense of community were 4.7 times more likely (OR 4.7, 95% CI 2.7 to 8.4, p<0.001), to report moderate, severe or extremely severe symptoms of stress. The

association remains after adjusting for the demographic and socioeconomic covariates. Compared with individuals with a positive sense of community, those with a neutral sense of community were 1.2 times more likely (OR 1.2, 95% CI 0.8 to 2.0, p=0.38), and those with a negative sense of community were 2.8 times more likely (OR 2.8, 95% CI 1.7 to 4.4, p<0.001), to report moderate, severe or extremely severe symptoms of stress. Several covariates were associated with stress, including age (p=0.002) and gender (p=0.03).

Sensitivity analysis

Sensitivity analysis with different cut-off points was performed for robustness of the results. For a sensitivity analysis, we grouped respondents based on a three-point categorical variable: a 'positive sense of community (score range: 1–2)', 'neutral (score range: 2–4)' and a 'negative sense of community (score range: 4–5)'. For the consolidated three-point scale in the sensitivity analysis, the average response for all eight items is 18.1% (n=334) for a 'positive sense of community', 60.1% (n=1000) for 'neutral' and 21.8% (n=340) for a 'negative sense of community'.

Sensitivity analysis suggests similar findings with the main findings of the study. The overall results and directions did not change. The results of the sensitivity analysis presenting ORs for moderate, severe and extremely severe symptoms of depression, anxiety and stress by levels of sense of community as well as included covariates are presented in online supplemental appendix D.

DISCUSSION

Our findings suggest that sense of community, a limited form of social capital, is negatively associated with self-reported symptoms of depression, anxiety and stress. They provide a foundation for exploring further the importance of social relationships in promoting and protecting mental health in a turbulent and increasingly insecure society. Compared with those with a positive sense of community, those with a neutral or negative sense of community had significantly higher odds of reporting moderate, severe or extremely severe symptoms of depression, anxiety and stress.

As expected, several individual demographic and socioeconomic characteristics are significantly associated with mental well-being as measured by depression, anxiety and stress symptoms reported in the last 7 days. However, not all relationships are consistently in the same direction. It is widely known that, overall, age is associated with improved mental health.[31] While age is strongly associated with enhanced symptoms of mental illness among 2014–2016 SHOW respondents, the association is not uniform across age groups. Socioeconomic status, commonly measured by educational attainment and income, is well known to be negatively associated with symptoms of poor mental health.[32] We found them to be associated as well. They are negatively associated with depression and anxiety, but not

with stress. In other words, higher education and higher income levels do seem to protect individuals from depression and anxiety, but not from stress. Women were more likely to experience moderate, severe, and extremely severe anxiety and stress compared with men. Race and ethnicity, marital status and residential area are not significantly associated with depression, anxiety or stress.

Overall, we found strong associations between sense of community and symptoms of mental illness. These findings are important for two reasons. First, the survey items in SHOW for sense of community reference one's neighbourhood rather than a broader spatial or psychological scope of social support. Studies have shown that living in a neighbourhood with high social capital is associated with better health.[33] 'Neighbourhood' in some studies means census block, census tract or postcode. Less formal designations of neighbourhoods are commonplace in many, if not most American communities. SHOW leaves it up to respondents to interpret neighbourhoods without any specific geographical boundaries, partly because respondents live in rural, suburban and urban areas. Nonetheless, their reference point is likely a fairly discrete geographic area nearby to their residence. So how can that limited source of sense of community impact health and well-being? According to Eicher and Kawachi,[34] people's physical surroundings and social lives affect how they perceive their community and behave in formal and informal interactions. Formal interactions encourage contact between people through town hall meetings or soccer team practices. At the same time, informal encounters are ubiquitous on a day-to-day basis, like bumping into a neighbour while going for a run or getting the mail. Thus, our results offer insights into how place matters and that neighbourhoods can influence health, for better or worse, and serve as a logical target for health-oriented changes. If our findings are validated by subsequent research, then neighbourhood-level initiatives to create and strengthen positive social relationships would be warranted.

The second reason these findings are important is that the limited sense of community probed in 2014–2016 SHOW participants likely represents a lower bound of the impact of social capital on health outcomes. Although the neighbourhood is a meaningful form of community that individuals often find a connection to, one's sense of community is not bound to physical proximity or geographic distance only. Comparing the different types and levels of sense of community deriving from neighbourhood to other relationships (eg, family, friends, coworkers, hobbies, professional colleagues) would more fully account for resources individuals can turn to for information, assistance and psychological support.

More significantly, this analysis examines sense of community, only one type of social capital. The SHOW items for sense of community only measure certain cognitive perceptions about one's community (cognitive social capital), not actual behaviours and explicit social relationships such as group membership and participation

(structural social capital). As Almedom[35] noted, social capital is a compound and complex term requiring multi-dimensional definitions and corresponding methods to measure and investigate.[35] So our study measures only a modest portion of the potential impacts of social relationships on general health and more specific conditions such as mental illness.

In addition to exploring only a restricted form of social capital, the study has other limitations. First, there may be a selection bias against people with fair or poor mental health. Those who agreed to participate in SHOW are likely to have a mental health status that allows them to take part in the lengthy and comprehensive survey. Similarly, those persons with a lower sense of community—or who value community less—may be less likely to participate in SHOW. Second, there could be information bias. Considering how DASS-21 asks sensitive questions on mental health, it is possible that participants are not fully reporting their symptomatic experiences. This may have led to under-reporting of the symptoms of depression, anxiety and stress. Third, relying solely on self-reported information may not capture the fullest representation of sense of community, and it could be argued that other data sources could be valuable in supplementing self-reports (eg, Glynn identifies multiple predictors of sense of community).[36] Amongst, expected length of community residency, satisfaction with the community and the number of neighbours one could identify by first name are the strongest predictors. These can be supplemental measures to the self-reported sense of community questions. Fourth, there may be unobserved covariates related to people's engagement at the neighbourhood level or to symptoms of mental illness that limit the robustness of the findings. For instance, parents with young children are very likely to be more involved with neighbours and other community residents through daycare, school or other activities.

A final limitation is that the analysis is cross-sectional, and the associations found cannot identify causal direction. It is possible, and even likely, that there are bidirectional effects such as worse mental health leading to lower levels of social interaction and sense of community. For instance, Maher et al[37] show that depression predicts older adults' lower social support and Park et al[38] show the link between depression and reduced online social support through Facebook. In order to better understand the underlying pathways, longitudinal data would be useful.

CONCLUSION

This study extends the current understanding of the connections between social capital and mental health. Findings indicate that a positive sense of community is associated with a reduced reporting of depression, anxiety and stress symptoms. Although this study was limited to only one type of social capital, the strong positive association between a neighbourhood-based sense of community and symptoms of mental illness suggests that the neighbourhood is a meaningful form of community for giving and receiving assistance, building trust, and other contributors to well-being. This study provides a foundation for adding new measures of social capital into future studies and investigating a wider range of health outcomes.

ORCID iDs
Eunice Y Park http://orcid.org/0000-0001-8453-5835
Paul E Peppard http://orcid.org/0000-0001-6019-2743
Kristen C Malecki http://orcid.org/0000-0002-7305-6895

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