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Feature Articles

A comparative study of social capital and hospital readmission in older adults

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ABSTRACT

Numerous factors contribute to hospital readmissions of older adults. The role social capital may play in preventing hospital readmissions is unknown. The aim of this descriptive, cross-sectional study was to determine if levels of personal social capital differ in two groups of patients aged 65 and older, those readmitted to the hospital within 30 days of discharge and those not readmitted. Participants in this study (N = 106) were community-dwelling older adults discharged from 11 hospitals in the Midwestern United States. The Personal Social Capital Scale and a demographic questionnaire were mailed to eligible participants for completion. Multivariate Analysis of Variance (MANOVA) was computed to examine the differences in the dependent variables of bonding and bridging social capital between those patients readmitted within 30 days and those not readmitted within 30 days. No significant differences between the two groups' mean levels of bonding or bridging social capital were identified.

Introduction

In 2010, Congress enacted the Medicare Hospital Readmission Reduction Program (HRRP), which penalizes hospitals for above average readmission rates related to certain conditions.[1] The amount of money owed to hospitals by the Centers for Medicare and Medicaid Services (CMS) is reduced by up to 3% when there are excess readmissions for any of the following clinical conditions: acute myocardial infarction (AMI), heart failure (HF), pneumonia, chronic obstructive pulmonary disease (COPD), elective total hip or knee replacement, and coronary artery bypass graft (CABG) surgery.[1] Of the 3,241 hospitals who had their readmissions evaluated by the Centers for Medicare and Medicaid Services (CMS) in fiscal year (FY) 2017, 4 of 5 were penalized, with 48 hospitals being penalized the maximum of 3%.[2]

In 2016, the 21st Century Cures Act became law, requiring that CMS invoke penalties on hospitals for readmissions based on their performance in relation to other hospitals (peer group) with a like proportion of patients who are on both Medicare and Medicaid (dual eligible).[3] Beginning in FY 2019, this new strategy will be implemented with CMS calculating the median excess readmission ratios (ERRs) for each peer group.[3] No additional medical conditions have been added to the list and the maximum penalty will remain at 3%.[3]

Because of the penalties associated with hospital readmissions, it is important to investigate potential contributing factors. Studies show that 30-day readmission rates for the targeted conditions have decreased, but at a much slower pace than when the HRRP was first implemented as part of the Affordable Care Act (ACA).[4] While concerns about readmissions existed prior to ACA passage, no dramatic decreases were seen until best practices began being shared and penalties instituted.[4] However, the dramatic decreases in readmission rates have not been sustained.[2] As a result, consideration needs to be given to patient factors, not just the quality of care problems that hospitals have been working to rectify. According to the Dartmouth Atlas report, there is a vast list of care quality problems that have been shown to contribute to readmission and that hospitals are working to address.[5] One issue is poor communication between providers leading to lack of a coordinated plan of care post discharge and lack of follow up.[5] Discharge education was also found to be inadequate, with patients and caregivers lacking understanding on what to do after discharge including what medications to take and stop.[5] Discharging patients with a treatment plan for their primary admitting diagnosis but neglecting to address other critical health problems was also identified.[5]

Researchers have begun studying a variety of factors not related to quality of care in the hospital that could be related to hospital readmissions. Some of the factors being studied include functional

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limitations and difficulty with activities of daily living after discharge, socio-demographic characteristics, socio-economic determinants, cognitive capabilities, social isolation and lack of social support.[6–8] While the two patient factors of social support and relationships with people who provide care after hospital discharge have been studied independently, no studies have investigated these two factors together by measuring social capital and its relationship to hospital readmissions. Robert Putnam defined social capital as networks among individuals and the norms of reciprocity and levels of trust that come from them, with norms of reciprocity being types of social support provided by or exchanged between persons within the networks.[9]

Bonding and bridging delineate different types of social capital.[10] Bonding social capital is obtained from groups where individuals are alike, exclude outsiders, and have strong in-group loyalty.[9,10] Groups with this attribute encourage communication and relationships necessary to pursue common goals.[10] Bridging social capital is inclusive, with persons associating with others unlike themselves but at the same level socially.[10,11] In these types of relationships there is problem solving within communities as people get to know each other and cultivate relationships, share information, and mobilize community resources.[10]

Research that examined the association between social capital and physical or mental health, health and disease promoting behaviors, illness prevention, utilization of healthcare resources, and mortality guided this study as well as several models including a modified version of Andersen's Behavior Model, the Social Capital as Mediator Model, and the Conceptual Model for the Relationship of Social Networks and Social Support to Health[12–14] A review of the literature revealed that an individual's level of social capital is significantly associated with general, mental, and physical self-rated health or health factors.[14–21] Individual social capital is also related to healthy behaviors, including cancer screening, physical activity, and smoking abstinence.[21–23] Nieminen and colleagues also found a relationship between social capital and alcohol consumption, diet, and rest.[21]

Social capital and its relationship to use of healthcare services have also been investigated.[24,25] Williams analyzed social capital in relation to variations in utilization of healthcare services based on geographical locations.[25] Social capital was determined by using Robert Putnam's Comprehensive Social Capital Index which considers how engaged residents are in public affairs including voting in presidential elections, participation in community action groups, and social trust.[25] Healthcare utilization was determined using data from several organizations, such as the Dartmouth Atlas, Centers for Disease Control, and Express Scripts.[25] Data analysis showed that in states with lower levels of social capital there were increases in hospital length of stay and additional physician visits.[25] Moreover, persons in these states had higher numbers of select medical procedures.[25]

Studies have also been conducted investigating the relationship between social capital and mortality. In the seminal work by Kawachi and colleagues, it was reported that there was a strong relationship between income inequality and per capita group membership and absence of social trust.[26] These social capital variables were associated with total mortality as well as mortality rates associated with coronary heart disease, cancer, and infant mortality.[26] In the meta-analysis of 20 studies conducted by Nyqvist et al. it was determined that higher structural social capital, defined by broader social networks, and social participation were both associated with decreased mortality rates.[27]

Despite the association between social capital and health, healthy behaviors, healthcare utilization, and mortality, no studies were found that investigated the association between social capital and hospital readmission. Because of this gap in the literature, a comparative study using quantitative methods to determine if levels of bonding and/or bridging social capital differed between older adults who were discharged from the hospital and readmitted within 30 days compared to older adults discharged and not readmitted was conducted. This population was selected because of the HRRP penalties associated with the readmission of Medicare patients. It was hypothesized that levels of social capital would differ between older adults readmitted to the hospital and those who were not readmitted, with those older adults not readmitted having a higher level of bonding and/or bridging social capital than those older adults not readmitted.

Additionally, differences in levels of bonding and/or bridging social capital between older adults from different geographical locations, of different gender, marital status, race or ethnicity, level of education, and income were also measured. Studies demonstrate that access to aspects of social capital can vary based on socioeconomic factors as well as race and gender.[18]

Methods

Design, setting and sample

This descriptive, cross sectional study was conducted at a large healthcare system in the Midwestern United States. The healthcare system's institutional review board approved the study. A proportionate quota sample (n = 106) was obtained from adults aged 65 and older discharged from 11 hospitals belonging to one healthcare system. These older adults were discharged during a 12-month period with a primary diagnosis of AMI, CABG, HF, pneumonia, COPD, elective total hip arthroplasty (THA), or total knee arthroplasty (TKA). The quota sampling was done using these seven diagnoses in order to ensure the sample was proportionate to the population. Inclusion criteria were adults aged 65 or older hospitalized and subsequently discharged with a primary diagnosis of AMI, CABG, HF, pneumonia, COPD, elective THA or elective TKA. Persons unable to read or write English or have the survey translated for them, and those discharged to a nursing home, long-term care facility, or incarcerated, were excluded from the study.

Procedure

Two reports were generated that identified patients meeting inclusion criteria and discharged in the prior twelve months. One report included eligible patients readmitted within 30 days of discharge and the other included eligible patients not readmitted. Each report was reviewed to ensure no account number was on the lists more than once to avoid sending multiple surveys to the same person. Eligible persons were mailed a letter explaining the study and offering them the opportunity to volunteer to participate. Included with the letter were the Personal Social Capital Scale (PSCS) survey developed by Chen et al. to measure social capital, a demographic survey, and a self-addressed stamped envelope to return all documents.[28] Completing and returning the surveys indicated consent to participate. To determine group responses, light blue paper was used for the surveys sent to patients readmitted, and light yellow paper was used for surveys sent to non-readmitted patients. Each survey was numbered with recipients' corresponding discharge diagnoses (1–7) in order to quantify the number of surveys completed by diagnoses.

Measures

The PSCS measures social capital. Reliability and validity have been established in the United States and China.[29] Chen and colleagues reported that pilot work led to a finalized scale of 10 core questions.[28] The instrument was developed and tested in 128 Chinese

adults ages 18 through 50.[28] The instrument had not been used previously to assess social capital in older adults but was selected for this study because of its ability to measure both bonding and bridging social capital with minimal questions as compared to other instruments. Further, this instrument could be completed on paper.

The PSCS questions provide information regarding a person's network connections as an asset, as they are related to network size, amount of resources possessed, frequency of interaction, trustworthiness and what those in the network are willing to do for the person (reciprocity).[28] The 10 core questions are identified as Cap1-Cap10: Cap1-Cap5 measure bonding social capital and Cap6-Cap10 measure bridging social capital. There are two to six answers for each core question. For example, core question Cap3 asks the following: "Among the people in each of the following six categories, how many can you trust?" (p. 316).[28] For each of the six categories, which includes family members, relatives, neighbors, friends, co-workers, and old classmates, the participant selects a response that is measured using a Likert scale. One of the Likert scales used range from "none or a few" (1) to "all or a lot" (5). The response scores are added and then averaged to obtain a score for each of the 10 core questions. Subsequently, the average scores for each of the first five core questions (Cap1-Cap5) are added together and then divided by 5 to determine a score for bonding social capital. The average scores for each of the last five core questions (Cap6-Cap10) are added together and then divided by 5 to determine a score for bridging social capital. The scores for both bonding and bridging ranges from 1, as the lowest, to 5, the highest.

Chen et al. used intrapersonal factors, community environment factors, and activities associated with accumulation of social capital to assess predictive validity of the PSCS.[28] Correlation analysis indicated that the 10 core items correlated with the total scale score, with correlation coefficients varying from 0.37 to 0.77 (<0.01 for all) for the overall PSCS (Cronbach's alpha = 0.87).[28] For the five bonding social capital core items, correlation coefficients with the overall PSCS ranged from 0.53 to 0.77 and the Cronbach's alpha was 0.85.[28] The five core items were positively correlated with each other ($r = 0.37 - 0.74$, $p < 0.01$ for all).[28] For the five bridging core items, correlation coefficients with the overall PSCS ranged from 0.42 to 0.74 and the Cronbach's alpha was 0.84.[28] Each of these five core items also positively correlated with the others, with correlation coefficients ranging from 0.28 to 0.63 ($p < 0.01$ for all).[28]

Demographic information obtained included gender, marital status, race/ethnicity, highest level of education, approximate household income before taxes, and area of primary residence, delineated as metropolitan, urban, suburban, or rural.

Data analysis

All data were analyzed using the IBM SPSS 22.0 (IBM Corp, Armonk, NY, 2013). Descriptive statistics were computed to characterize the sample as well as data distribution and to check assumptions. Multivariate Analysis of Variance (MANOVA) was computed to examine differences in the dependent variables of bonding and bridging between patients 65 or older readmitted within 30 days and patients 65 and over not readmitted in 30 days. MANOVA also tested the differences in the dependent variables with the independent variables of gender, residence, marital status, education, income, and discharge diagnoses. All statistical significance is reported at $p \leq .05$.

Results

Data were obtained from 128 of the 1,185 eligible participants, yielding a response rate of 11%. Of the 128 surveys returned, 22 were not used because they were missing 20% or more of the data and/or included comments inferring a lack of understanding of the survey. Missing data for the remaining surveys were handled by averaging those items that were scored for each section (Cap1-Cap10). As demonstrated in Table 1, 61.3% (n = 65) of participants who completed the survey were male and 93.5% (n = 99) were White/Caucasian. Over half of the participants (n = 63, 61.2%) reported having at least some college or were a college graduate, and more than one-third (n = 45, 43%) had an annual income of over $50,000.

Table 1
Participant demographics.

	N (%)
Residence	
Metropolitan	32 (30.2)
Urban	18 (17)
Suburban	17 (16)
Rural	39 (36.8)
Gender	
Male	65 (61.3)
Female	41 (38.7)
Marital Status	
Married/Partnered	60 (56.6)
Widowed	33 (31.1)
Divorced	13 (12.3)
Education	
Elementary	3 (2.8)
Some high school	5 (4.7)
High school (4 years)	32 (30.2)
Some college	34 (32.1)
College graduate (4 or more years)	29 (27.4)
No response	3 (2.8)
Income	
Under $10,000	4 (3.8)
10,000 to 19,9999	11 (10.4)
20,000 to 34,999	15 (14.2)
35,000 to 49,999	19 (17.9)
50,000 to 74,999	20 (18.9)
75,000 to 99,999	15 (14.2)
100,000 or more	10 (9.4)
No response	12 (11.2)
Ethnicity	
Asian	1 (0.9)
Black/African American	2 (1.9)
White/Caucasian	99 (93.5)
Two or more races	1 (0.9)
Other	1 (0.9)
No response	2 (1.9)

In this study, the Cronbach's alpha was .85 for the overall PSCS, 0.83 for bonding social capital, and 0.87 for bridging. The results from a one-way MANOVA revealed no significant differences on the dependent variables of bonding and bridging social capital between patients 65 or older readmitted within 30 days and patients 65 and over not readmitted in 30 days (Wilk's $\Lambda = .995$, $F(2, 103) = 0.25$, $p = .776$, $\eta^2 = .005$). Older adults who were readmitted within 30 days reported very similar levels of bonding ($M = 3.10$, $SD = 0.75$) and bridging ($M = 2.54$, $SD = 0.83$) social capital with bonding ($M = 3.01$, $SD = 0.63$) and bridging ($M = 2.52$, $SD = 0.73$) social capital of those who were not readmitted. There were also no significant differences between education, area of residence, gender, marital status, race/ethnicity, or income on bonding and bridging social capital using the Wilk's Λ criterion (see Table 2).

Discussion

In this descriptive study, the intention was to determine if individual bonding and bridging social capital differed between older adults readmitted to the hospital within 30 days of discharge and those not readmitted. No significant difference in either type of social capital between the two groups was found. A possible explanation for the

Table 2
MANOVAs for differences in social capital levels of demographic variables.

Independent Variable	Value	F	df	P	Social Capital	Means	Partial Eta Squared
Education	.92	2.04	4	.09			.04
High School or less					Bonding	2.84	
					Bridging	2.38	
Some college					Bonding	3.28	
					Bridging	2.66	
College graduate					Bonding	3.10	
					Bridging	2.58	
Residence	.89	2.07	6	.06			.06
Metropolitan					Bonding	3.26	
					Bridging	2.70	
Urban					Bonding	3.17	
					Bridging	2.67	
Suburban					Bonding	3.13	
					Bridging	2.74	
Rural					Bonding	2.80	
					Bridging	2.23	
Gender	.99	0.64	2	.53			.01
Male					Bonding	3.10	
					Bridging	2.60	
Female					Bonding	2.97	
					Bridging	2.43	
Marital Status	.92	2.12	4	.08			.04
Married/Partnered					Bonding	3.10	
					Bridging	2.52	
Widowed					Bonding	3.15	
					Bridging	2.66	
Divorced					Bonding	2.57	
					Bridging	2.25	
Race/Ethnicity	.98	0.86	2	.43			.02
White					Bonding	3.04	
					Bridging	2.51	
Other					Bonding	3.24	
					Bridging	2.97	
Income	.85	1.82	8	.08			.08
34,999 or less					Bonding	2.68	
					Bridging	2.26	
35,000-49,999					Bonding	3.19	
					Bridging	2.62	
50,000-74,999					Bonding	3.24	
					Bridging	2.68	
75,000-99,999					Bonding	3.18	
					Bridging	2.70	
100,000 or more					Bonding	3.05	
					Bridging	2.84	

lack of a significant difference in the two groups is reverse causation as it relates to health and changes in networks. Rather than social capital having an impact on illness and hospitalization, these factors could influence a person's amount of social capital. According to Aartesen and colleagues, health conditions could influence the relationships of older adults.[30] Aartesen et al. reported that physical decline led to a decrease in interactions with friends and neighbors, but an increase in family interactions. If cognitive decline was present, interactions diminished with both groups.[30] Li and Zhang reported similar findings.[31] They sought to determine if diverse network types influence older adults' health outcomes differently, and whether the health of these older adults affected the type of networks with which they affiliated.[31] Li and Zhang found that the type of social network to which a person subscribed had an impact on their physical, cognitive, psychological, and overall health and that older adults tended to gradually withdraw from networks not consisting of relatives.[31] As a result, older adults became limited to being part of family or restricted networks.[31] When comparing health outcomes of older adults belonging only to family and restricted networks as compared to health outcomes of older adults belonging to diverse network types, those belonging to only the family and restricted networks had worse health outcomes.[31] Friend-focused networks had the greatest benefit to physical health as compared to family focused networks.[31] Li and Zhang concluded that many older adults might enter into a cycle where they become a part of networks of little benefit and with inadequate resources that will result in poor physical and mental health, and lead to further withdrawal from social interactions.[31]

Strengths and limitations

Strengths of this study were the use of proportionate quota sampling and surveying patients discharged from multiple hospitals. Proportionate quota sampling minimizes variances of sample estimates because of different discharge diagnoses, while surveying persons from more than one facility reduces selection bias. In addition, this study did not rely on secondary analysis of data. As pointed out by Abbott, many studies utilize secondary analysis of data sets that were never intended to measure social capital.[32]

There were limitations to this study, however. This was a correlational, cross-sectional study with a small sample size; there were several p-values approaching statistical significance when bonding and bridging were compared by selected demographic variables such as education, residence, marital status, and income. Obtaining a larger sample size in future studies could lead to statistical significance if present. Knowing if social capital is significantly different between these groups has implications for clinical practice as they are factors

that nurses and providers cannot impact. However, it may be possible to offset the differences by providing access to increased social capital from other sources.

Inability to assess with confidence whether or not the person completing the survey was cognitively impaired was also a limitation. Because medical records were not reviewed prior to distributing the surveys, excluding participants who were cognitively impaired or suffered from dementia was not possible. Therefore, surveys were reviewed for comments that would suggest a lack of understanding, and if present, those surveys were considered incomplete and excluded. It is possible, however, that participants who were cognitively impaired could have completed the survey.

The PSCS was tested in adults aged 18 to 50.[28] The population for this study was 65 years and over and the survey responses brought one major issue to light. When evaluating bonding social capital, participants were asked how many contacts they have (a lot, more than average, average, less than average, a few) in six categories: family members, relatives, people in their neighborhood, friends, coworkers/fellows, and friends from their hometown or old classmates. They were also asked how many (all, most, some, few, or none) in each group they keep in routine contact, how many they trust, and how many would help them upon request. Many of the respondents left the coworkers/fellows answers blank in multiple questions. Consequently, data used to measure bonding social capital could be skewed. The instrument should be evaluated and revised for use in a population which includes retired adults. Further, this study was limited to older adults from two states in the Midwest and may not be representative of older adults in general.

Another limitation to this study is that the two groups were homogenous in their composition. Both groups of participants were adults at least 65 years of age, and were hospitalized at least once in the past year. Further, the majority of participants in each group suffered from at least one illness or injury and may not have been in optimal health. With the exception of the study by Malino et al., who found a relationship between social capital and hypertension, other studies used self-reported health as the independent variable.[14,16,18–20,23] Patient perceptions of their health were not measured in this study as it is subjective.

Conclusion

There are no studies that have led to the development of a model predicting patient risk for readmission for the elderly.[33] Most studies assess readmissions based on demographics, clinical features, and utilization of healthcare resources.[33] Further, many readmission models focus on specific disease processes and aspects associated with that disease, mainly considering comorbidities, medications and diagnostic testing.[33] Consideration of social factors is limited. As demonstrated in the prediction model to determine unplanned cardiovascular readmissions for adults with heart failure, developed by Betihavas, et al., the only social factors assessed were whether or not a person lived alone and whether they were sedentary.[34] The researchers found that being older, living alone, being sedentary and having multiple comorbidities were risk factors for readmission but their model had limited discrimination.[34] Considering additional factors associated with social support and relationships could have provided for a more predictive model.

The findings of this study coupled with the limitations demonstrate the need for a valid and reliable instrument to measure social capital in the older adult population. Future research should include development and testing of such a tool and then expanding the study to a larger sample of discharged older adult patients. Face-to-face interviews instead of a mailed survey should also be considered. As reported by Williams, hospital readmissions are potentially indicative of low quality health care and could be related to several manifestations of low social capital.[25] If it is then determined that an association between social capital and hospital readmission exists, further research can be conducted to explore whether low levels of social capital can serve as a predictor for hospital readmission. Further understanding of the link between social factors and recovery after illness can provide information that can influence social program financing as well as enhancement of home health programs and community nursing. Sound research could also be valuable for those who must make decisions on the funding provided for these programs as well as the development of social policy.

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