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Research Article

Do Psychological and Social Factors Correspond with Health Care Utilization?

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Abstract

Background: There is evidence that unhelpful thoughts and distress regarding symptoms are associated with more frequent care utilization. Among people seeing a musculoskeletal specialist in person, we sought relationships between mental and social health factors and the number of 1) self-reported in-person healthcare contacts, 2) remote healthcare contacts, and 3) total healthcare contacts during the 6-week period prior to the visit.
Methods: We enrolled 148 adult patients in a cross-sectional study of people visiting a musculoskeletal specialist for a new or return visit. Patients indicated the number of self-reported remote and in-person healthcare contacts, and completed measures of social health, unhelpful thoughts regarding symptoms, general distress, and demographics.
Results: Accounting for potential confounding in multivariable analysis, more pre-visit self-reported in-person care episodes were independently associated with more unhelpful thoughts about symptoms [higher score on Negative Pain Thoughts Questionnaire (NPTQ), regression coefficient: 0.05, $P < 0.05$] and household income between \$15000 and \$29999 or \$30000 and \$49999. No factors were associated with the total number of pre-visit remote and in-person care contacts.
Conclusion: The observation that patients with greater unhelpful thinking seek out more in-person care episodes for musculoskeletal symptoms supports the concept that comprehensive care strategies attentive to common unhelpful thoughts regarding symptoms could limit resource utilization.

Keywords: Health Care Utilization; Psychological Factors; Social Factors

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Background

There is some evidence that greater unhelpful thoughts and distress regarding symptoms are associated with greater care utilization (1). In a one-year study of 314 elderly patients, the numbers of telephone consultations and total healthcare utilization were associated with a greater mental focus on a negative state (rumination) (2). A study of people with severe asthma found that comorbid diagnosed mental illness was associated with more frequent visits to the general practitioner, emergency department visits, and hospitalizations (3). Studies of people with a somatoform disorder documented more specialty care than primary care visits, outpatient utilization and cost approximately double those associated with inpatient care, and more unplanned (urgent or emergency care) visits (4, 5). These lines of evidence suggest that greater utilization of healthcare may signal relatively greater feelings of worry or despair, more substantial unhelpful thoughts regarding symptoms, or important life stressors and other aspects of social health.

Evidence that people who seek more care for a discretionary musculoskeletal condition are more likely to be experiencing mental and social health care opportunities would provide further support for comprehensive, biopsychosocial models of care. An additional benefit of such models might be optimal stewardship of health resources and limited exposure to potential financial, psychological, and iatrogenic harms associated with unhelpful medical care.

Among people presenting to an in-person musculoskeletal specialty care visit, this study addressed the relationship between mental and social health factors and factors associated with the number of self-reported 1) in-person healthcare contacts, 2) remote healthcare contacts, and 3) total healthcare contacts within 6 weeks prior to the visit.

Methods

Study Design and Setting: All new or return English-speaking adults (18 years or older) seeking musculoskeletal specialty care at one of several offices in an urban area in the United States (US) were invited to participate between April and May 2021. Patients were approached by research assistants who were not directly involved in care and completed surveys on a tablet device or phone using a

quick-response code (QR code) in a private exam room without a researcher present. All patients who were not fluent in English or were unable to provide verbal informed consent were excluded. The participants were informed that they could stop responding to the questionnaires at any point. Our Institutional Review Board approved the protocol and accepted completing the survey as a form of consent (protocol number:

2018-10-0145). All patients completed the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences (PRAPARE), number of self-reported remote and in-person care episodes, measures of psychological factors such as Negative Pain Thoughts Questionnaire (NPTQ), Patient-Reported Outcomes Measurement Information System (PROMIS), anxiety and depression computerized adaptive tests (CATs), and demographics.

Participants: Seventy-four women (50%) and seventy-four men with an average age of 51 [standard deviation (SD): 18] completed the questionnaires. More than half of the patients had more than a high school education (n = 110, 74%). Around half of the patients earned more than $100000 annual household income (n = 68, 46%) and had full-time work (n = 72, 49%) (Table 1).

Table 1. Patient demographics

Variable	Value#
Number	148
Age (year)	51 ± 18
Gender	
Man	74 (50)
Woman	74 (50)
Education	
Less than high school/high school	38 (26)
More than high school	110 (74)
Marital status	
Married or partner	83 (56)
Single/widowed/divorced	65 (44)
Annual household income	
Less than $15000	18 (12)
Between $15000 and $29999	10 (7)
Between $30000 and $49999	16 (11)
Between $50000 and $99999	36 (24)
More than $100000	68 (46)
Insurance status	
Private	93 (63)
Uninsured/MAP/Medicaid/other	55 (37)
Work status	
Unemployed	24 (16)
Part-time or temporary work	18 (12)
Full-time work	72 (49)
Otherwise	34 (23)
Return or new	
Return	82 (55)
New	66 (45)
Method of referral	
Primary care clinician	62 (42)
Self-referral/another specialist	86 (58)
PROMIS (t-score)	
Anxiety	52.7 ± 8.4
Depression	48.7 ± 8.6
Pain intensity	3.7 ± 2.5
PRAPARE (social health)	4.8 ± 1.6
NPTQ (unhelpful thoughts)	8.0 ± 4.3

#Continuous variables are presented as mean ± standard deviation (SD) and categorical variables as number (percentage)

PROMIS: Patient-Reported Outcomes Measurement Information System; NPTQ: Negative Pain Thoughts Questionnaire; PRAPARE: Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences; MAP: Medicaid Advantage Plus

Measurements: PRAPARE is the most common questionnaire used by the US healthcare system to assess social determinants of health. It is a questionnaire with 15 items that address social needs (such as housing status and stability, finances, insurance status, and others) and results in a continuous score ranging from 0 through 22, with higher scores indicating more social stressors (6).

The PROMIS depression CAT and PROMIS anxiety CAT measure symptoms of depression and anxiety, respectively, on a continuum (7-9). PROMIS CATs are expressed as a t-score that is standardized to the US general population. A t-score of 50 represents the mean, and a 10 score above or below the mean represents 1 SD away from it. Higher scores indicate greater symptoms of depression and anxiety. The NPTQ-4 is a 4-item questionnaire that quantifies unhelpful thoughts about pain. It results in a score between 4 and 20, with higher scores indicating higher unhelpful thoughts (10, 11).

Outcome Variables: Patients were asked about the number of in-person and remote contacts or care episodes for the symptoms that formed their concern in the six weeks before they presented for musculoskeletal specialty care. Remote contacts include phone calls, emails, text messages, or online portal messages with a doctor, nurse, or physician's assistant.

Study Size: An a priori sample size calculation demonstrated that 102 participants would provide 80% statistical power in a linear regression with ten predictors to account for 15% of the overall variability in in-person and remote care contacts and with the assumption that NPTQ would account for 7% or more of the variability in the number of care contacts, with an alpha set to 0.05. To account for the nonparametric distribution in the number of care contacts and for incomplete responses, we enrolled 148 patients.

Statistical Analysis: We performed descriptive statistics of all participants. In bivariate analysis, we sought factors associated with the number of patient-reported in-person, remote, and total number of visits. Mann-Whitney U and Kruskal-Wallis H tests were conducted where appropriate. The normality of the data was checked using the Shapiro-Wilk test in the Stata software (Stata Corporation, College Station, TX, USA). Spearman rank correlations were calculated for continuous variables bivariate analysis. All variables with $P < 0.10$ were moved to multivariable regression analysis. Due to the non-parametric nature of the response variable, we used negative binomial regression analysis to seek factors associated with the utilization of care. All P-values below 0.05 were considered statistically significant (12-15).

Results

Factors Associated with the Number of Patients Who Self-reported In-person Care Contacts within Six Weeks of the Initial Visit

Accounting for potential confounding variables including the method of referral and the insurance types in multivariable analysis, a greater number of in-person care episodes prior to a visit with a musculoskeletal specialist was independently associated with more unhelpful thoughts about symptoms [higher score on NPTQ, regression coefficient: 0.05, 95% confidence interval (CI): 0.02 to 0.09, $P < 0.05$] and household income between $15000 and $29999 or $30000 and $49999 (Tables 2 and 3).

Factors Associated with the Number of Patients Who Self-reported In-person or Remote Care Contacts within Six Weeks of the Initial Visit

No factors were associated with the number of remote contacts six weeks before the visit with a musculoskeletal specialist. Among the planned explanatory variables, only household income was associated with more care episodes (Table 2); therefore, no multivariable model was created.

Discussion

People seek care when a symptom becomes a concern. Based on the evidence, we hypothesized that unhelpful thoughts about symptoms might be associated with the total number of care visits among people with musculoskeletal symptoms (4, 16). We found that greater unhelpful thoughts about symptoms and lower household income were associated with more in-person medical care during the six weeks prior to a musculoskeletal specialty care visit.

Table 2. Bivariate analysis of factors associated with the number of patients reporting in-person visits, remote visits, and all visits

Variable	In-person visits		Remote visits		All visits	
	Median (IQR)	P-value	Median (IQR)	P-value	Median (IQR)	P-value
Categorical variables						
Gender		0.650		0.770		0.650
Man	1 (1-3)		2 (0-5)		4 (2-7)	
Woman	1 (1-2)		2 (0-3)		3.5 (1-6)	
Visit		0.510		0.710		0.620
Return	1 (1-3)		2 (0-4)		4 (2-6)	
New	1 (1-2)		2 (0-5)		4 (1-7)	
Marital status		0.880		0.230		0.490
Married or partner	1 (1-2)		1 (0-4)		3 (1-7)	
Single/widowed/divorced	1 (1-2)		2 (0-5)		4 (2-6)	
Method of referral		0.040		0.940		0.290
Primary care clinician	2 (1-2)		2 (0-3)		4 (2-5)	
Self-referral/another specialist	1 (0-2)		2 (0-5)		3 (1-7)	
Annual household income		0.006		0.910		0.070
Less than $15000	1 (1-2)		2 (0-5)		2.5 (1-7)	
Between $15000 and $29999	3.5 (1-5)		2 (0-3)		5.5 (4-8)	
Between $30000 and $49999	2 (1.5-3)		2 (0.5-5)		5.5 (3-9)	
Between $50000 and $99999	1 (0.5-2)		2 (0-3)		3 (1-5)	
More than $100000	1 (0.5-2)		2 (0-4.5)		3.5 (2-6)	
Education		0.540		0.370		0.870
Less than high school/high school	2 (1-3)		2 (0-3)		4 (2-6)	
More than high school	1 (1-2)		2 (0-5)		4 (2-7)	
Work status		0.460		0.150		0.840
Unemployed	1 (0.5-3)		0 (0-4.5)		3.5 (1-7)	
Part-time or temporary work	1 (1-2)		0.5 (0-3)		3 (1-6)	
Full-time work	2 (1-3)		2 (0-5)		4 (2-6)	
Otherwise	1 (1-2)		2.5 (1-6)		3.5 (2-7)	
Insurance status		0.090		0.460		0.240
Uninsured/MAP/Medicaid/other	1 (0-2)		4 (0-1)		3 (1-6)	
Private	2 (1-3)		2 (0-5)		4 (2-7)	
Continuous variables	Spearman correlation coefficient (ρ)	P-value	Spearman correlation coefficient (ρ)	P-value	Spearman correlation coefficient (ρ)	P-value
PROMIS (t-score)						
Anxiety	0.130	0.110	0.070	0.370	0.130	0.110
Depression	0.030	0.760	0.110	0.170	0.090	0.280
NRS (pain intensity)	0.080	0.340	-0.080	0.330	-0.020	0.850
PRAPARE (social health)	0.060	0.500	-0.050	0.540	0.040	0.630
NPTQ (unhelpful thoughts)	0.140	0.080	-0.005	0.960	0.090	0.280

All variables with $P < 0.10$ were moved to multivariable analysis

PROMIS: Patient-Reported Outcomes Measurement Information System; NRS: Numeric Rating Scale; NPTQ: Negative Pain Thoughts Questionnaire; PRAPARE: Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences; MAP: Medicaid Advantage Plus; IQR: Interquartile range

There were a few limitations to consider. First, about 20 patients were excluded because of incomplete questionnaire data. Since this is atypical for our research team outside of the coronavirus disease (COVID) pandemic, we think it is related to using QR codes and letting people use their phones to complete the surveys.

People who left without finishing questionnaires might be different from people that did not, but the small number of people and the diversity within the sample should make the results reproducible in other cohorts. Second, we included symptoms at various sites, and studies of specific sites or diseases might have different results. Prior research suggests that this is not the case, and we believe the possibility that findings differ by anatomic site or specific pathology is relatively unlikely, although nonspecific pain might be an exception worth studying further. Third, most patients were married, employed, well educated, and socioeconomically relatively advantaged and had high household income status. A study with more socioeconomic variability might have different results as we may not have had adequate representation or diversity in social health. Fourth, given the relatively notable number of remote care episodes (median: 2) and our inclusion of phone calls in the list of options for remote care, it is possible that many patients included correspondences to set up care, such as calling for an appointment, when we intended to measure a discussion with a clinician about their clinician. Fifth, we studied self-reported care episodes to capture care inside and outside our system. The reader should regard this as a study of self-reported care episodes rather than objectively tracked care. We feel that for most patients, these two are likely to align.

The observation that a greater number of in-person care contacts within six weeks of a musculoskeletal specialty care visit is associated with greater unhelpful thoughts and low income indicates that unhelpful thoughts about symptoms, perhaps in combination with fewer options or a longer delay to access medical care, may motivate people to present to urgent care, a chiropractor, or others prior to or concomitant with seeing their primary care doctor or a specialist.

Table 3. Multivariable negative binomial regression analysis of factors associated with the number of patients reporting in-person visits

Variables	Regression coefficient (95% CI)	Standard error	P-value
Method of referral			
Primary care clinician	Reference value		
Self-referral/another specialist	-0.23 (-0.55 to 0.08)	0.161	0.150
Annual household income			
Less than $15000	Reference value		
Between $15000 and $29999	0.90 (0.22 to 1.58)	0.348	0.010*
Between $30000 and $49999	0.71 (0.08 to 1.34)	0.321	0.027*
Between $50000 and $99999	-0.26 (-0.87 to 0.35)	0.309	0.400
More than $100000	0.29 (-0.27 to 0.85)	0.284	0.310
Insurance status			
Uninsured/MAP/Medicaid/other	Reference value		
Private	0.08 (-0.26 to 0.43)	0.175	0.639
NPTQ	0.05 (0.02 to 0.09)	0.017	0.002*

*Indicates statistical significance, $P < 0.05$.

NPTQ: Negative Pain Thoughts Questionnaire; CI: Confidence interval; MAP: Medicaid Advantage Plus

Our findings are consistent with evidence that comorbidities, such as diagnosed mental health disorders (like major depression) and lower income, are associated with higher resource utilization and health care costs among adult patients with chronic medical diseases, such as asthma, congestive heart failure (CHF), diabetes, epilepsy, hypertension (HTN), chronic pulmonary disease, and chronic kidney disease (17).

Another study of 367 patients in one of 3 urban family medicine practices noted that estimated diagnoses of generalized anxiety disorder (GAD), panic disorder, and posttraumatic stress disorder (PTSD) based on a screening tool were substantially associated with more primary care visits, more non-psychiatric hospitalizations, and more emergency department visits (18). Unhelpful thoughts about symptoms (misinterpretations) can contribute to discrepancies between patient and clinician conceptualization of the illness, which might hinder effective communication and contribute to mistrust, and mistrust might result in extra visits to clinicians in an attempt to resolve conflicts between one's experience of the illness and the clinician's expertise (19-24). One recent study found that the duration of expertise transfer could be longer in patients with greater unhelpful thoughts (20). With regard to income and socioeconomic status (SES), mixed findings in prior studies suggest that the association with more in-person visits could be spurious, confounded, or specific to the disease, symptoms, or circumstances. One study found that people with lower SES made more in-person primary care visits than individuals with higher SES (25). In contrast, a study of patients diagnosed with chronic sinusitis found that greater utilization of specialty care was associated with socioeconomic advantage, including college-level education, higher median income, private insurance, and neighborhoods with a lower proportion of minorities (26). In our setting, people have equitable access to musculoskeletal specialty care regardless of income.

The observation that remote care contacts and a total number of contacts had fewer associated variables suggests that in-person visits, in particular, and not overall care-seeking, may be a measure of unsettlement. In other words, seeking clarification about the care strategy or check-in about progress may not be a marker of unhelpful thoughts as much as insisting on the care occurring at an in-person visit. It may also be that people included all the forms of contact they used to set up the in-person appointment rather than the types of direct contact with clinicians we intended to study if it is true that in-person visits specifically are a marker of mental health opportunities. In that case, it may be helpful to improve care intentionally, setting up regular check-ins when people have greater unhelpful thoughts or distress about symptoms in order to maintain trust and keep them within the safety and security of care that will not expose them to unhelpful tests and treatments while limiting inconvenience and resource utilization (27). With agreement from the patient, many of these care episodes could occur remotely using an asynchronous test with or without images and video (text, portal, email), real-time text chat, and phone and video calls. One of the potential benefits of this type of care strategy is the sense of more facile access to care (28).

Patients who seek more in-person care episodes before a musculoskeletal specialty care visit may be experiencing more unhelpful thoughts. For instance, a person may go to urgent care between a visit to their primary care physician and the musculoskeletal specialist or present to urgent care several times. They might also seek opinions from clinicians outside of mainstream medicine. When a clinician hears about these efforts to receive in-person care, it could trigger a noticing statement such as "This has thrown you off". It might spark a discussion that elicits unhelpful thinking or symptoms of worry or despair.

Conclusion

Using guiding rather than directing communication tactics (as in motivational interviewing) may help patients to become aware of feelings of distress and unhelpful thoughts about their symptoms. Patients that feel heard and understood and within the embrace of care are likely to feel more reassured, which might reduce the utilization of care.

Conflict of Interest

The authors declare no conflict of interest in this study.

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