2017

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ABSTRACT

The prevalence and chronic nature of arthritis make it the most common cause of disability among U.S.A adults. Family support reduces the negative impact of chronic conditions generally but its role in pain and depression for arthritic conditions is not well understood. A total of 844 males (35.0%) and 1567 females (65.0%) with arthritic conditions ($n = 2411$) were drawn from the 2012 Health and Retirement Study to examine the effect of family support on pain and depressive symptoms. Using regression analysis and controlling for age, ethnicity, gender, marital/educational status and employment/income, physical function/disability status, pain and antidepressant medications, and other clinical indicators of chronic health conditions, we examined the effects of family support (spouse, children, other) on pain and depression levels. Results indicated that depressive symptoms decreased significantly with strong family and spousal support ($p < .05$). Pain decreased as support levels increased, but was non-statistically significant. This study provides new insights into the relationship between family support, pain, and depression for individuals with arthritis. Future longitudinal studies are needed to evaluate family support and relationships over a wider spectrum of demographics.

Introduction

The population of older adults (aged 65 years and older) in the United States is steadily growing, with an estimated near doubling of the 43.1 million population in 2012 to more than 83 million older adults by 2050 (Ortman, Velkoff, & Hogan, 2014). As a result, more older adults are experiencing aging-related health problems such as arthritis, a chronic and sometimes disabling disease (Barbour et al., 2013). Arthritis involves the inflammation of joints in which joint function decreases and pain is present (Sluka & Westlund, 1992). Different types of arthritis include osteoarthritis, rheumatoid arthritis, gout/lupus, and other rheumatic conditions. Arthritic diseases, including osteoarthritis and rheumatoid arthritis,

cost the U.S.A over $80 billion in medical expenditures and $47 billion in lost work, on-the job-productivity, household assistance, and other possible burdens (Yelin et al., 2007).

Arthritic limitations mainly result from pain, the most common and excruciating symptom of arthritis (Keefe, Brown, Wallston, & Caldwell, 1989). In addition to the disabling effect of pain, research indicates a strong relationship between arthritis related pain and depression (Brown, Glass, & Park, 2002; Covic et al., 2012; Covinsky, Lindquist, Dunlop, & Yelin, 2009). Arthritis pain is an important predictor of depression, indicating a directional relationship (Courvoisier et al., 2012).

Prior research has focused on the multidimensional interactions between physical, mental, and social health factors in populations with arthritic conditions. These studies are best understood through the lens of the biopsychosocial model: a general model which states that physiological, psychological and social factors all play a significant role in optimal human health functioning (Covic, Adamson, Spencer, & Howe, 2003). In the case of arthritis, the biopsychosocial model would posit an interaction between physical factors of pain, psychological factors of depression, and social factors such as social support. Social support is defined as perceptions of individuals' belonging and connectedness with others; that they are cared for, loved, esteemed, and part of a mutually supportive network (Cobb, 1976). Support can be extended in the form of emotional support (i.e. a listening ear), tangible support (i.e. financial resources, donating time), or belonging support (i.e. feeling included, wanted, connected to others) (Uchino, 2004). Social support has been seen as a protective factor provided to important social network members that modifies biological resistance to disease processes (Uchino, 2004; Uchino & Birmingham, 2010). As such, social support may help individuals with certain diseases cope with prevailing symptoms.

Many studies involving arthritis found that social support is strongly related to both pain (Brown, Wallston, & Nicassio, 1989; Roberts, Klatzkin, & Mechlin, 2015) and depression (Ferreira & Sherman, 2007; Zyrianova et al., 2006). For example, arthritis patients who received more social support were less likely to be depressed when experiencing higher levels of pain (Brown et al., 1989). The negative impact of arthritis pain on depression was also found to be buffered by social support (Lee, Kahana, & Kahana, 2016). However, two studies involving patients with RA concluded that social support and pain were not significantly related (Anderson et al., 1987; Ødegård, Finset, Mowinckel, Kvien, & Uhlig, 2007).

There is a large body of literature on the effects of social support. Much of the research has focused on sources of support that combine family, friends, neighbors, and even pets. Yet for most adults, their relationships with their spouse and children are the most central relationship in their lives and social support from families has been shown to have many beneficial outcomes (Birmingham, Uchino, Smith, Light, & Butner, 2015). In particular, research on family support has shown marriage to be associated with lower rates of morbidity and mortality (Johnson, Backlund, Sorlie, & Loveless, 2000), greater life satisfaction and happiness and lower risk for depression (Robins & Regier, 1991; Robles, Slatcher, Trombello, & McGinn, 2013). Family support can be measured by how close individuals feel to their family (i.e. a sense of belonging) and how they perceive this support (i.e. tangible support, emotional support). Several studies have found that support from families generally plays a key role in how well individuals living with chronic diseases are able to function (Coty & Wallston, 2010; Lekka et al., 2014).

Prior studies examining family support have generally not examined individually the potentially unique contributions of spouse, children, and other (additional) family members

to the *family support* dynamic, especially in individuals with arthritis. Thus, the main aims of this study were to examine (1) the effect of family support and relationships on pain after controlling for demographic, socio-economic status and comorbidities; (2) the effect of family support and relationships on depressive symptoms after controlling for demographic, socio-economic status and comorbidities; (3) to examine differences between support offered by spouses, by children and by other family members; and (4) to examine the effects of perceived positive (i.e. understanding, caring) and negative (i.e. criticizing, demanding) support from family members.

Methods

Public data were obtained from the 2012 Health and Retirement Study (HRS). The HRS includes a nationally representative sample in the U.S.A of individuals aged 50 or older surveyed on a wide range of data such as demographics, health status, spending information, income, family, and retirement. The HRS is conducted in the United States every two years and is structured for examining the U.S.A population and not for global interpretations. The present study is an examination of the 2012 data provided by the RAND Corporation. Additional information about the HRS can be found online at http://hrsonline.isr.umich.edu.

Sampling

The HRS 2012 data-set included 11,656 adults with arthritis. Out of those, 8133 were excluded due to missing information on self-reported pain, receiving or not receiving support, and a total depression score based off of depressive symptoms. There were 1112 under the age of 65 who were also excluded. Thus, the effective sample size for this study is 2411.

Family support

Family support was measured using a social support scale structured for the HRS that consists of similar items originally developed by Schuster, Kessler, and Aseltine Jr. (1990). The social support scale exhibits reliable psychometrics and has been used in previous studies (Clarke, Fisher, House, Smith, & Weir, 2008; Walen & Lachman, 2000). Included in the scale are seven items divided into three positive and four negative support subdomains, each question repeated three times to separately reference spouses, children, and other family. Positive support was assessed with three Likert-scale items (1 = a lot to 4 = not at all): (1) How much do they (spouse, children, or family members) understand the way you feel about things? (2) How much can you rely on them if you have a serious problem? (3) How much can you open up to them if you need to talk about your worries? Negative support was assessed with four Likert-scale items (1 = a lot to 4 = not at all): (1) How often do they (spouse, children, or family members) make too many demands on you? (2) How much do they criticize you? (3) How much do they let you down when you are counting on them? (4) How much do they get on your nerves? Items were reverse-coded so higher positive scores indicated higher positive social support and higher negative scores indicated higher negative social support. A summary score was calculated by averaging the scores of the different family support sources (spouse/children/other family) for an overall positive support score and an overall negative support score based off of the scoring method shown

in the HRS codebook documentation (Clarke et al., 2008). In addition, we created scores for each family support source that were averaged and calculated separately for each individual source of relationship support.

Pain

Pain was self-reported and measured with an initial question, 'Are you often troubled with pain?' If respondents answered 'yes', they were then asked a following question, 'How bad is the pain most of the time: mild, moderate, or severe?' If respondents answered 'no', they were considered to have 'no pain'. Based on these two questions, we created a 'pain' variable for this study, where no pain and mild pain were categorized as 'No Pain'; moderate and severe pain were categorized as 'Pain'. This variable was dichotomized due to very small sample size observed in the mild and severe pain categories. This measure has been used in previous studies since it has been found to prompt a level of clinical responsiveness which has been recommended by the American Geriatrics Society Guidelines for the Pharmacologic Management of Persistent Pain in Older Adults and the National Comprehensive Cancer Network Clinical Practice Guidelines in Oncology (Network, 2009; Persons, 2009).

Depression

Depressive symptoms were measured using eight items from the HRS' modified version of the Center for Epidemiologic Studies Depression Scale (CES-D) (Steffick, 2000; Turvey, Wallace, & Herzog, 1999). Specifically, respondents were asked if within the prior week, they: (1) felt depressed (2) felt they put effort into activities (3) experienced restless sleep (4) were happy (5) felt lonely (6) enjoyed life (7) felt sad and (8) felt unmotivated. Items four and six were reverse-coded. Total scores ranged from 0 (no depressive symptoms) to 8 (severe depressive symptoms), with a cutoff score of 3 or more as an indicator of clinical depression (Steffick, 2000). This cutoff score has been shown to have high sensitivity and specificity (Steffick, 2000; Turvey et al., 1999). This modified version of the CES-D has also been widely used in other studies (Capistrant, Berkman, & Glymour, 2014; Pertl, Lawlor, Robertson, Walsh, & Brennan, 2015)

Covariates

Covariates for this study included age, ethnicity, gender, marital/educational status and employment/income. These covariates were based off of prior literature examining the determinants of health outcomes (Chen, Rizzo, & Rodriguez, 2011; Pisinger et al., 2009). We also controlled for physical function/disability status, pain and antidepressant medications, and clinical comorbidity indicators such as blood pressure, cancer, diabetes, stroke, heart disease, and lung problems based off studies involving standard pain variable analyses (Covinsky et al., 2009; Nicassio et al., 2012). Lastly, we controlled for functional limitation consistent with prior studies (Reyes-Gibby, Aday, Todd, Cleeland, & Anderson, 2007) using the following question, 'Does the pain make it difficult for you to do your usual activities such as household chores or work?' Respondents had an option to select yes/no, stating whether the presence or absence of pain limited their functional status. A list of all covariates can be found in Appendix 1.

Statistical analysis

Descriptive statistics were performed to analyze respondents' backgrounds. Mean, standard deviation median and interquartile ranges were computed for the continuous variables. Frequency and proportion were reported for categorical variables. Parametric statistic testing was then performed to provide higher statistical power and avoid the assumptions of similar spread and dispersion of scores necessary for non-parametric testing.

Logistic regression models were conducted to examine the relationship between family support and pain. Linear regressions were used to explore the relationship of family support with depressive symptoms. Two additional models examined spouse, children, and other immediate family relationships and their associations with pain and depressive symptoms. Covariates that were shown to be significant in bivariate analysis were included in the final regression models. Data were analyzed using SPSS 22.0. Statistical significance was set at $p < 0.05$ at two-tails. Adjusted and unadjusted Odds Ratios (ORs) and the corresponding 95% Confidence Intervals (CIs) were reported for the logistic regression models. Standardized and unstandardized Beta Coefficients (B) and the corresponding 95% CI were reported for the linear regression models.

Results

Our present study included a total of 844 males (35.0%) and 1567 females (65.0%) with arthritic conditions ($n = 2411$). The average age of respondents was 76.0 years (SD, 6.8 years; range, 65–101 years). Respondents were mainly Caucasian ($n = 2061$; 85.5%) and African American ($n = 281$; 11.7%) (Table 1). A total of 711 respondents reported pain (29.5%) while 1692 respondents reported no pain (70.2%). Clinical depression occurred in 492 respondents (20.4%).

Covariates determined to be significant for positive family support on depressive symptoms included age, education, marital status, functional limitations, employment status, high blood pressure, lung disease, heart condition, stroke, pain medication, and depression medication. Significant covariates for both positive and negative family support on pain included gender, age, education, functional limitations, employment status, high blood pressure, diabetes, lung disease, heart condition, pain medication, and depression medication.

Table 2 shows the results from the logistic regression model for family support on pain. We began by examining each support source separately (e.g. spouse, children, and other family members). Positive support from a spouse (crude OR .79,95% CI .66–94, $p < 0.05$; adjusted OR = 1.2, 95% CI .81–1.6, $p = 0.42$), from children (crude OR .85, 95% CI .75–.97, $p < 0.05$; adjusted OR .94, 95% CI .70–1.6, $p = 0.68$), or from other immediate family (crude OR .96, 95% CI .87–1.1, $p = 0.49$; adjusted OR 1.1, 95% CI .86–1.4, $p = 0.44$) were not significantly associated with pain. However, there was a trend towards lower pain reporting as each source of support rose. For negative family support, there was no significant association with pain in relation to the respondent's spouse (crude OR 1.4, 95% CI 1.2–1.6, $p < 0.05$; adjusted OR .97, 95% CI .70–1.4, $p = 0.87$), children (crude OR 1.5, 95% CI 1.3–1.8, $p < 0.05$; adjusted OR 1.4, 95% CI .89–2.1, $p = 0.16$), and other immediate family (crude OR 1.4, 95% CI 1.3–1.7, $p < 0.05$; adjusted OR = 1.2, 95% CI 0.8–1.9, $p = 0.36$). Likewise, we also found no significant association with pain when all sources of support were averaged together for an overall positive family support score (crude OR .83, 95% CI .71–.96, $p < 0.05$; adjusted

Table 1. Demographic characteristics of respondents ($n = 2411$).

Characteristics	n	%	Mean	SD	Median	Range
Age (years)			76.0	6.84	75.0	65–101
Gender						
Male	844	35.0				
Female	1567	65.0				
Ethnicity						
Hispanic/Latino	93	3.9				
Non-Hispanic/Latino	2318	96.1				
Race						
White	2061	85.5				
Black	281	11.7				
Other Non-white	69	2.9				
Arthritis						
Osteoarthritis	1448	60.1				
Rheumatoid arthritis	365	15.1				
Gout/lupus	194	8.0				
Unknown/other	404	16.8				
Pain						
No pain	1692	70.2				
Pain	711	29.5				
Depression						
No depression	1919	79.6				
Clinical depression	492	20.4				
Comorbidities						
High blood pressure	1726	71.6				
Diabetes	605	25.1				
Cancer (excluding skin)	553	22.9				
Lung disease	343	14.2				
Heart conditions	884	36.7				
Stroke	223	9.2				

Table 2. Relationship between family support and pain.

Pain	n	Missing	OR	p	S.E.	95% CI	AOR	p	S.E.	95% CI
Positive family support										
Overall support	2397	14	0.83	0.01	0.08	0.72–0.96	1.12	0.40	0.13	0.86–1.45
Spouse	1419	992	0.77	0.01	0.09	0.66–0.92	1.16	0.42	0.18	0.81–1.64
Children	2232	179	0.85	0.02	0.06	0.75–0.97	0.94	0.68	0.15	0.70–1.64
Other immediate family	2224	187	0.96	0.49	0.05	0.87–1.07	1.10	0.44	0.13	0.86–1.42
Negative family support										
Overall support	2397	14	1.65	0.000	0.08	1.40–1.95	1.35	0.06	0.16	0.99–1.83
Spouse	1417	994	1.37	0.000	0.09	1.15–1.62	0.97	0.87	0.17	0.70–1.36
Children	2233	178	1.53	0.000	0.07	1.33–1.77	1.36	0.16	0.22	0.89–2.09
Other immediate family	2222	189	1.45	0.000	0.08	1.25–1.69	1.22	0.36	0.22	0.80–1.86

OR 1.1, 95% CI .86–1.4, $p = 0.40$). We did observe a trend towards increased levels of pain when the scores of each negative support source were summed and averaged for an increasing overall negative family support score (crude OR 1.6, 95% CI 1.4–1.9, $p < 0.05$; adjusted OR $= 1.3$, 95% CI 1.0–1.8, $p = 0.06$).

Next, the effects of positive and negative family support on depressive symptoms were examined. Positive support from a spouse was significantly associated with depressive symptoms ($\beta = -.14$, $b = -.49$, $p < 0.05$) such that higher positive support predicted lower symptoms of depression. However, positive support from children and other immediate family was not significantly associated with depressive symptoms ($\beta = -.01$, $b = -.03$, $p = 0.69$; $\beta = .01$, $b = .03$ $p = 0.64$) (Table 3). Results for negative family support on depressive

Table 3. Relationship between family support and depression.

| Depression	n	Missing	b	β	p	S.E	95% CI
Positive family support							
Overall support	2397	14	−0.491	−0.141	0.001	0.145	−0.776–0.205
Spouse	1419	992	−0.655	−0.245	0.000	0.077	−0.806–0.503
Children	2232	179	−0.029	−0.012	0.692	0.073	−0.172–0.114
Other immediate family	2224	187	0.027	0.014	0.637	0.057	−0.086–0.140
Negative family support							
Overall support	2397	14	0.844	0.223	0.000	0.158	0.535–1.154
Spouse	1417	994	0.570	0.202	0.000	0.128	0.318–0.822
Children	2233	178	0.044	0.014	0.784	0.162	−0.274–0.363
Other immediate family	2222	189	0.286	0.088	0.082	0.164	−0.036–0.608
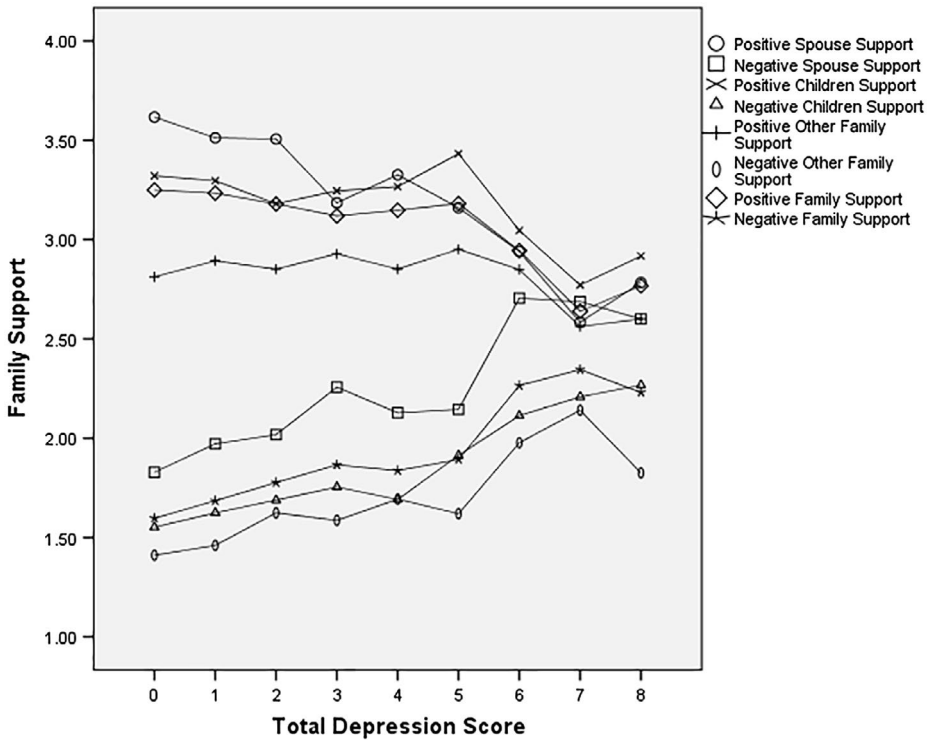
Figure 1. Trend of the relationship between family support and depression.

symptoms were similar to positive family support. Negative support from a spouse was significantly associated with depressive symptoms ($\beta = .20$, $b = .57$, $p < 0.05$) such that higher negative support from a spouse predicted greater depressive symptoms. Negative support from children and other immediate family was not significantly associated with depressive symptoms ($\beta = .01$, $b = .04$, $p = 0.78$; Persons, 2009 $= .08$, $b = .29$, $p = 0.08$). When all sources of support were averaged together for an overall positive or negative family support score, we found both positive and negative family support overall to be significantly associated with depressive symptoms ($\beta = −.14$, $b = −.49$, $p < 0.05$; $\beta = .22$, $b = .84$, $p < 0.05$) (Table 3) such that greater overall positive support was associated with lower depressive symptoms, and greater overall negative support was associated with greater depressive symptoms. The trend of the relationship between family support and depression is also shown in Figure 1.

Discussion

The objective of this cross-sectional study was to explore the relationship of overall family support and the unique contribution of positive and negative support from spouse, children and other family members separately on both pain and depressive symptoms in older adults with arthritis. Family support has been associated with beneficial physiological and psychological effects on health outcomes including decreased pain and depression levels (Dean, Kolody, & Wood, 1990). However, *family support*, as a whole, can include support from various members of the family, and that support may differ depending on the role of the family member. Thus it is important to understand how family support from each family member category contributes to both pain and depression as organizations consider incorporating family support considerations into high quality healthcare.

Our results are consistent with prior research stating that the presence of social support in general either lowered or buffered pain and depression levels for individuals with RA (Brown et al., 1989; Evers, Kraaimaat, Geenen, Jacobs, & Bijlsma, 2003; Roberts et al., 2015). Findings from our study suggest that there is a significant association of overall positive and negative family support with depressive symptoms. Previous studies have similarly found an association between social support and depression (Ferreira & Sherman, 2007; Zyrianova et al., 2006) but our study further stresses the importance of specific types of social support, such as family support categories. Although there may be other sources of support in an individual's life, family support has been found to be a source which can lower depression and can be highly important for arthritis care and management. Despite evidence for the importance of family support, we found no association for family support and pain. While having the support of family members throughout the pain experience can provide a feeling of validation, this support may not be able to reduce the actual experience of pain. This finding is consistent with prior studies that have found no association between social support and pain (Anderson et al., 1987; Ødegård et al., 2007).

When we examined the separate subdomains of negative and positive support we found both negative and positive support from family members to be significantly associated with depressive symptoms, though there was slight variation in the results depending on the source of support. Specifically, support from a spouse was associated with lower depression scores while negative support from a spouse correlated with higher levels of depressive symptoms. Positive support from children related to reduced symptoms of depression but negative support from children did not have a measurable relationship with depressive symptoms. Research has shown that support coming from primary sources (a close or significant other) can be more powerful than secondary sources of support and that a generalized perception of support predicts health better than measures of received support (which may be context specific) (Thoits, 2011). Our findings support research that the effect of social support can depend on the type of relationship. In marital relationships, depression may decrease with more positive support through shared experiences and has more potential to increase through negative relationship interactions, while negative support from other relationships potentially do not have the same influence.

After adjusting for covariates, positive and negative support from a spouse retained a significant relationship with reported depressive symptoms; however, support from children or other immediate family members remained statistically non-significant for both pain and depressive symptoms. This is consistent with prior literature (Dean et al., 1990). One reason may be that the flow of intergenerational support in many families is stereotypically

downstream: parents provide support to their younger children and then often continue to provide support to their grown children. In fact, historically older individuals have viewed their role with their children as a 'parenting' role even when the children are grown, and have expressed the hope that they will never need to ask their children for assistance, nor to 'encumber' their lives (Blieszner & Mancini, 1987). Indeed, parents may not actively *seek* support from children due to these attitudes and expectations of the parental-child role and a desire not to burden their already busy children. Our analysis of specific types of family support, where spousal support had a greater effect than the support of an adult child, highlights the need to specify types of family support in future research.

Limitations

Since our study is a cross-sectional study, we could not account for the varying trends of family support over a longitudinal time period. An analysis with a longitudinal approach may have helped in establishing clearer relationships between family support, pain, and depression. Pain and depressive symptoms may have also fluctuated with more or less family support if measured over longer periods of time. We did not examine the role of other possible mediators of pain and depressive symptoms, (e.g. optimism or autonomy). The pain measure is also a self-report measure that has not been widely studied in terms of its psychometric properties, which can result in over or underreporting of pain. Additionally, our sample mainly consists of Caucasians and African Americans, with small sample sizes for other races that may be more susceptible to disease progression and the lack of family support. Our sample also does not include those outside the U.S.A, so it is not representative of individuals worldwide. Lastly, there were no data on whether or not respondents were being treated for pain and depressive symptoms. If respondents were seeking treatment, pain and depressive symptoms could have been lower or higher as a result.

Conclusion

Despite these limitations, our study provides new insights on the relationship between family support, pain, and depression for individuals with arthritis. Future research should focus on longitudinal analyses that can evaluate family support and relationships for different types of arthritis over a wide range of demographics.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix 1. Covariates included in the study.

Variable name	Description	Response
Gender	Respondent's gender	(1) Male (2) Female
Age	Respondent's age	
Degree (education)	Degree of education	(0) No degree (1) GED (2) High school diploma (3) Two year college degree (4) Four year college degree (5) Master degree (6) Professional degree (Ph.D, M.d, J.D.) (7) Degree unknown/some college
Nmarst (marital status)	2012 marital status	(1) Married (2) Separated (3) Widowed (4) Never Married (5) Marital status unknown
Ethnicity	Ethnicity type	(0) Not obtained (1) Hispanic, Mexican (2) Hispanic, Other (3) Hispanic, type unknown (5) Non-Hispanic
Race	Respondent's race	(0) Not obtained (1) White/Caucasian (2) Black or African American (3) Other
Nc106 (functional limitations)	Does the pain make it difficult for you to do your usual activities such as household chores or work?	(1) Yes (5) No
Nj020 (employment status)	Working for pay	(1) Yes (5) No
Nc005 (high blood pressure)	Has a doctor ever told you that you have high blood pressure or hypertension?	(1) Yes (5) No
Nc010 (diabetes)	Has a doctor ever told you that you have diabetes or high blood sugar?	(1) Yes (5) No
Nc018 (cancer of any kind excluding skin)	Has a doctor ever told you that you have cancer or a malignant tumor, excluding minor skin cancer?	(1) Yes (5) No
Nc030 (lung disease)	Has a doctor ever told you that you have chronic lung disease such as chronic bronchitis or emphysema?	(1) Yes (5) No
Nc036 (heart condition)	Has a doctor ever told you that you have had a heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems?	(1) Yes (5) No
Nc053 (stroke)	Has a doctor ever told you that you have had a stroke?	(1) Yes (5) No
Nn361 (pain medication)	Do you regularly take prescription medications for any of the following common health problems: For pain in your joints or muscles?	(1) Yes (5) No
Nn365 (depression medication)	Do you regularly take prescription medications for any of the following common health problems: To help relieve anxiety or depression?	(1) Yes (5) No