Predictors of Perceived Higher Quality Patient-Provider Communication in Patients with Rheumatoid Arthritis

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Introduction

Untreated rheumatoid arthritis (RA), an inflammatory autoimmune disease affecting approximately 1% of the U.S. population, can result in joint pain and damage, leading to joint dysfunction and ultimately, disability (American College of Rheumatology Subcommittee, 2002; Helmick et al., 2008). The World Health Organization (WHO) International Classification of Functioning, Disability, and Health is a globally-accepted, biopsychosocial model of disability (Stucki & Cieza, 2004; WHO, 2002). In this model "disability is always an interaction between features of the person and features of the overall context in which the person lives" (WHO, 2002, p. 9). The model included contextual factors (environmental and personal) that impact activity, body function and structure, and participation. An example of an external environmental factor is the geographic location where a person resides (WHO, 2002). Examples of internal personal factors include gender, age, and level of education (WHO, 2002). Within the model, there are eight separate components of body function and structure; nine components of activities and participation; and five environmental factors. Communication is one of the nine components of activities described in the International Classification of Functioning, Disability, and Health (WHO, 2002). This model also has disease-specific Core Sets. Core sets are disease-specific International Classification of Functioning, Disability and Health categories to be used when reporting patient functioning and health (Stucki & Cieza, 2004). Communication is one component of the Core Set for RA (Stucki & Cieza, 2004).

There is concordance between the importance placed on communication in the International Classification of Functioning, Disability and Health and that reported in prior research in

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patients with RA. Lempp and colleagues (2006) reported that high quality patient-health care provider communication is essential to the provision of effective RA care. Although there are established negative psychosocial effects of RA (e.g. employment restrictions, depression), the relationship between these effects and patient-provider communication is not well studied (Gåfvels, Hägerstrom, Nordmark, Wandell, 2012). The few existing studies found that effective communication promoted the development of a trusting patient-health care provider relationship, improved health outcomes, decreased grievances to medical regulatory authorities, facilitated optimal care, and improves adherence to prescribed medications (Berrios-Rivera et al., 2006; Fair, 2003; Tamblyn et al., 2007; Viller et al., 1999; Wolfe, 1995). Patient involvement in decision-making, the use of common, easily understood health terms by the provider, and the involvement of community leaders may improve patient-provider communication (Fagerlind, Ring, Brulde, Feltelius, & Lindblad, 2010; Hainsworth & Barlow, 2001; Ishikawa, Hashimoto, & Yano, 2006). Inadequate patient-health care provider communication is a barrier to optimal RA patient care (Bernatsky et al., 2010). Some issues with communication include lack of adequate time for communication and inadequate patient access to providers (Bernatsky et al., 2010).

Few environmental or personal factors have been investigated to determine their association with patient-provider communication in patients with RA. Traylor and colleagues (2010) found that Caucasian patients with higher incomes were 2.5 to 2.3 times respectively, more likely to have a discussion with their health care provider about the cost of their medications. When reviewing the literature outside of the RA population, Carcaise-Edinboro and Bradley (2008) also found that patient-provider communication affected rates of colorectal cancer screening and that perception of communication quality differed between races and ethnicities.

Thus, there is a significant gap in our understanding about those contextual factors (environmental and personal) that influence patient perception of higher quality patient-provider communication in patients with RA (Repping-Wuts et al., 2009). The identification of contextual factors associated with higher quality patient-provider communication could be instrumental to the development of targeted interventions to improve the efficacy of patient-provider communication, and subsequent outcomes. Thus, the purpose of this study was to evaluate contextual factors associated with patient-perceived quality of patient-provider communication in a group of patients with RA. The specific aims of the study were: 1) to compare internal personal factors (gender, age, race, education, employment status, marital status, duration of disease, and number of medications) and an external environmental factor (urban/rural residence) of individuals who perceived higher quality patient-provider communication with those who perceived lower quality; and 2) to evaluate the predictive power of internal personal factors (gender, age, race, education, employment status, marital status, duration of disease, and number of medications) and an external environmental factor (urban/rural residence) for higher quality patient-health care provider communication.

Methods

Design and Sample

This study was cross sectional, descriptive, and predictive. From October of 2009 to April of 2010, a convenience sample of 150 patients with RA was recruited from one urban university rheumatology clinic. The inclusion criteria specified that English-speaking persons, 18 years of age or older, with a current diagnosis of RA per the 1987 American College of Rheumatology Diagnostic Criteria (Arnett et al., 1988), determined by a health care provider who specialized in rheumatology, were eligible to participate in the study. Persons were excluded if they had obvious cognitive impairments determined by the rheumatology health care provider caring for the patient. Demographic and clinical characteristics were determined by completion of a demographic data form upon enrollment. Individual perception of quality of patient-provider communication was also measured at that time.

Instruments

The Patient-Health Care Provider Communication Scale—The *Patient-Health Care Provider Communication Scale* (PHCPCS) is a 21-item scale developed to measure patient perception of the overall quality of patient-health care provider communication (Salt, Crofford, Studts, Lightfoot, & Hall, 2012). This is the only scale with described psychometrics to measure patient perception of the quality of patient-health care provider communication in patients with RA. The initial 245 items were developed using focus group data and individual interviews of 15 patients with RA. Items were reduced after review by a behavioral scientist with expertise in scale development and decision-making, two rheumatologists with extensive research experience, and a nurse researcher with expertise in scale development. Items were rated using a 5-point Likert scale (5 = *agree very much* and 1 = *do not agree at all*) for conciseness, clarity, and topic relevance. Those items with a score of four or greater were retained. Six patients with RA reviewed the scale to determine comprehensibility and readability, and items were further revised. Psychometric testing that included the evaluation of dimensionality, internal consistency, and construct validity was performed in a sample of patients with RA ($n = 150$). Exploratory factor analysis determined that the scale measures two dimensions, *Quality Communication* and *Negative Patient-Health Care Provider Communication*. Cronbach's alphas for the *Quality Communication* and *Negative Patient-Health Care Provider* subscales in the current study were .94 and .73, respectively. Construct validity was supported by significant correlations with the *Perceived Involvement in Care Scale* total score ($r = .19$; $p = .02$) and the *Doctor Facilitation* subscale score ($r = .34$; $p = .01$) (Lerman et al., 1990; Salt et al., 2012).

Total score for the overall quality of communication scale is attained by summing all 21 items, which are rated on a 4-point Likert-type scale (1 = *not at all like*, 2 = *somewhat like*, 3 = *much like,* 4 = *very much like*). Four items are worded negatively and require reverse coding. Total scores range from 21 to 84, and a higher score reflects a better perception of the quality of patient-health care provider communication. Because we wanted to compare those with a higher perception of the quality of communication to those with a lower perception, we used the median score (median = 82 for this sample) to form these

comparison groups. The use of the median score to dichotomize has been used as a categorization strategy in a number of prior studies (Barber & Stott, 2004; Rakuša, Granda, Kogoj, Mlakar, & Vodušek, 2006).

Demographic and Clinical Data—Participants provided demographic and clinical information that included their age, gender, marital status, employment status, years of education, race and ethnicity, duration of disease, place of residence, and medications prescribed for RA. Rural (non-metro)/urban (metro) continuum codes were used to determine rural versus urban residence from the patient home address (U.S. Department of Agriculture, 2009).

Procedure

The university Medical Institutional Review Board approved this study. After a regularly scheduled rheumatology office visit, potential participants were asked by their health care provider if they were interested in participating in the study. Following confirmed interest, the principal investigator determined eligibility, and informed consent procedures were completed. Patients were then asked to complete the PHCPCS and respond to demographic and clinical questions on a data form. All data forms were identified by an assigned number. All data were transcribed into a spreadsheet (PASW Statistics, version 18, Chicago, IL) and inspected for normality. Data entry was evaluated for accuracy and final corrections were made to ensure 100% accuracy.

Data Analysis

Descriptive statistics, including means and standard deviations or frequency distributions, were used to summarize participant demographic and study variables. Patients were separated into two groups: those who perceived higher quality communication versus those who perceived lower quality using the median score of the PHCPCS. These groups were compared on demographic variables and medications used with chi-square tests of association or two sample t-tests depending on the level of measurement. Multiple linear regression modeling determined whether gender, age, race, education, employment status, marital status, urban/rural residence, duration of disease, and number of medications were independent predictors of higher perceived quality patient-provider communication. Given the negatively skewed dependent variable, a variety of data transformations were investigated. These did not improve the skewness/kurtosis of the patient-provider communication scale, so the untransformed total score was used in the analysis. Regression diagnostics, including variance inflation factors, normal probability plot, and studentized residuals were used to assess the presence of multicollinearity and to test the normality assumption. Data analysis was conducted using SPSS for Windows; an alpha of .05 was used throughout.

Results

Characteristics of the Sample

Participants ($N = 150$) were primarily Caucasian (92%), females (74%) with an average age of 53.9 years ($SD = 13.94$) (Table 1); this gender distribution is consistent with the U.S.

prevalence of RA in women, which is twice that of males (Helmick et al., 2008). About one third of participants were employed (30%) and slightly more than half were married (53%). The average time since diagnosis of RA was 11.1 ($SD = 10.7$) years. Participants were prescribed 2.5 ($SD = 1.1$) RA medications on average, in addition to other prescribed and over the counter medications. A variety of disease modifying anti-rheumatic drugs (DMARDs) were prescribed (Table 2); the most common was methotrexate (67%) followed by prednisone (41%), and hydroxychloroquine (33%). Fifty-five percent were also prescribed biologic therapies. Scores on the PHCPCS ranged from 52 to 84 with a mean score of 79.7 ($SD = 6.2$) (See Table 3). The mean item score was 3.80 out of 4. The positive mean item scores on scales measuring patient-provider communication is a common finding in prior studies of patient perceptions of patient-provider communication in other patient populations (Leckie, Bull, & Vrij, 2006; Makoul, Krupat, & Chang, 2007).

Comparison of Demographic and Clinical Measures Between Communication Quality Groups

Contextual factors of those who perceived higher quality patient-health care provider communication ($n = 75$) and those who perceived lower quality ($n = 75$) were compared using two sample t-tests for continuous variables and chi-square tests for association for categorical variables (Table 1). There were no significant differences in internal personal (gender, age, race, education, employment status, marital status, duration of disease, and number of medications) or external environmental (urban/rural residence) factors between groups. There also were no differences in the percent of patients prescribed each DMARD between those who perceived higher quality communication and those who perceived lower quality (Table 2).

Indicators of Poorer Communication Areas

While all 21 items in the overall scale showed very high ratings for quality communication with an average score of 3.8 out of 4, the items at or below the first quartile (i.e., the 25th percentile) included "Is concerned about my understanding of my health," "Am able to make health-related decisions because of the information provided by my health care provider," and "Understands my concerns about my health condition." These three were from the *Quality Communication* subscale and compromise 17% of this subscale. From the *Negative Patient-Health Care Provider Communication* subscale, three of the four items (75%) were at or below the first quartile. These items include "Is in a hurry when he or she is seeing me," "Makes me feel that I am bothering him/her with me medical concerns," and "Have avoided telling my health care provider about my health because I am afraid of what they will think or say." That these six items were the lowest rated of the 21-item scale suggested that it may be that the most difficult part of patient-provider communication (from the patient's view) relates to a sense of whether the provider is able to understand the patient's own concerns about his or her health. This also demonstrated that some patients may feel less satisfied with the amount of type of information given to them by their provider. Finally, these results underscore that the negative items, even though they were reverse-coded prior to analysis, may be slightly less applicable to this population, because three-quarters of these reverse-coded items were at or below the first quarter cutoff.

Predictors of Overall Quality of Communication

The Kolmogorov-Smirnov test for normality indicated that the total score for the quality of patient-provider communication was significantly different than normal ($p < .01$). The distribution of scores was skewed to the left, with many scores at or near the maximum score of 84. Several transformations, including square root and log, were conducted in an attempt to decrease the skewness and kurtosis, but these had little effect. Thus, the untransformed scores were used in the linear regression. The multiple linear regression model is shown in Table 4. Of the demographic and personal characteristics included in the model, the significant predictors of perceived quality of communication were years of education, total number or medications prescribed for RA, and residence (rural versus urban). The results of this model suggested that for every additional year of education, there was about a ½ point decrease in perceived communication quality. Also from this model, each additional medication prescribed for RA translated to an average increase in perceived communication quality of 1.1 points. Finally, those living in an urban area had an average communication score that was 2.5 points higher than those living in rural areas. As shown in Table 4, the variance inflation factors were all less than 1.4; this suggested a lack of multicollinearity in the model. The normal probability plot demonstrated minimal departure from normality as it approximated the diagonal line of agreement between the observed and expected values. Only six observations, or 4% of the participants, had studentized residuals outside two standard deviations. These regression summaries suggested the linear analysis was appropriate for these data, in spite of the skewed distribution of the dependent variable.

Discussion

Although prior research and the International Classification of Functioning, Disability, and Health (ICF) model (WHO, 2002) have identified communication as a key component of quality RA care, this is the first study to evaluate predictors of patient perception of the quality of patient-provider communication using a psychometrically tested, RA population-targeted instrument (Lempp et al., 2006). The results of the linear regression analysis suggested that more positive perception of patient-provider communication may be predicted by less education, residence in an urban area, and a greater number of prescribed medications for RA.

We found that education, an International Classification of Functioning, Disability and Health personal factor, impacted patient perception of quality patient-provider communication; less education was an independent predictor of higher quality patient-provider communication. Although there were no studies identified that directly investigated the role of education level in the perception of patient-provider communication in patients with RA, Neovius and colleagues (2011) found that less education was associated with the use of more sick days and greater disability payments compared with more educated patients. Similarly, Zhu and colleagues (2011) found that lower levels of education were predictive of greater indirect health care costs, which included productivity losses from sick days and disability leave. From these findings, one could conjecture that lower levels of education may be associated with employment that required greater physical activity; thus, any change in functional state may have reduced the ability to perform the required tasks and

necessitated the use of sick or disability days (Zhu et al., 2011). This hypothesis is supported by the ICF model of functioning and disability. In this model, communication is a key aspect of activity and personal factors (ex. level of education attained) along with a disease or disorder that impacts this important component of functioning and disability.

The prescription of a greater number of DMARDs, an internal personal factor, was an additional predictor of higher quality communication. This finding has not been reported in prior studies and may be related to the time the provider spent with the patient, the extent of focus on medication efficacy, and the degree of monitoring required due to potential adverse effects of the medications. The prescription of a greater number of medications could also be perceived by the patient as a provider who has listened to their concerns and responded with a medication prescription to address specific issues related to their RA. In addition, a greater number of prescribed medications may require the provider regularly monitor functional status, biological indicators, and patient status, which could be perceived as more frequent and better communication, as well as, higher quality care.

An additional independent predictor of higher quality of patient-provider communication was residence, an external environmental factor. Urban dwellers may be more accustomed to interacting with specialty care providers, tertiary care environments, and using sophisticated health care services. Vanasse and colleagues (2011) found that rural Scottish residents were less likely to use specialized services compared with urban dwellers. Similarly, Caldwell and Arthur (2009) concluded that the rural context of patients is not well understood by providers in urban areas. In their ethnographic study, rural patients referred for cardiac care described the stresses associated with extended travel time and the lack of understanding of providers about resources available to rural residents, or more particularly, the lack of resources. Thus, the lack of understanding of the rural context of life could lead to a perception of lower quality communication between patient and provider.

There are a number of important implications from our findings. Although the independent predictors of patients' perception of quality patient-provider communication identified were largely non-modifiable, providers can use study findings to adjust their communication to the varying demographic groups. Simply understanding that differences exist allows the opportunity for alterations in communication and improved patient care. For example, it may be that more educated patients would have greater satisfaction with additional detailed information about the specifics of RA and its treatment; future research is needed to assess how education and communication are linked in this population. We also observed that two of the lowest-scoring items pertained to patient perception that the provider understood patient concerns about their health and the third related to having sufficient information from the provider to make decisions about health.

Further studies should systematically address the predictive power of higher quality patient-provider communication for specific patient outcomes like functional and biological measures, psychological status, and behavioral indicators. The importance of additional external environmental and internal personal factors of the patient and provider also should be included in studies of communication and its quality, as the complexity of the communication process, content, and efficacy is illuminated by further research.

Limitations

This study included cross-sectional data from a predominantly Caucasian sample recruited from one university rheumatology clinic. Thus, determination of causation was not possible and our findings are not generalizable to patients with other demographic characteristics. However, our participants are representative of the geographic distribution of patients with RA in Kentucky. We also measured a limited number of clinical and demographic variables and these measures were self-reported. However, this study provides a clear starting point for further evaluation of the patient perception of communication between patient and provider. An additional limitation is that the majority of the sample reported a very good perception of patient-provider communication, so the amount of variability in this measure was small. While this has been a consistent finding in prior research studies of quality of communication in a variety of populations (Leckie et al., 2006; Makoul et al., 2007; Nelson et al., 2011), it may be worthwhile to assess whether additional items or a modified response or a modified response set for the PHCPCS may be able to measure more subtle characteristics of patient-provider communication. The item analysis also underscores this finding; not only were the scores for individual items high in general, but half of the items at or below the first quartile of the mean scores were in the negative communication subscale, even though this subscale compromised only 19% of the 21-item scale. It may be that the largest difference between the negative and positive items in the study is related to the polarity of the question, so further research is needed to assess the most appropriate way of gauging the positive and negative aspects of patient-provider communication.

Conclusion

As reported in the International Classification of Functioning, Disability and Health model and prior research, high quality patient-health care provider communication is imperative to excellence in care for patients with RA. We found that less education, prescription of a greater number of DMARDs, and urban dwelling are associated with higher quality of perceived communication. This investigation provided evidence for further study and for the future development of tailored communication interventions for patients with RA.

Acknowledgments

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Biography

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Table 1

Characteristics of the Participants with RA (N = 150)[*]

Variable	Total Sample (*N* = 150)	Higher Quality (*n* = 75)	Lower Quality (*n* = 75)	p-value[a]
Gender				
Female	111 (74%)	55 (73%)	56 (75%)	0.9
Age in years	*M*=53.9 (*SD*=13.9) Range: 21–83	*M*=52.3 (*SD*=13.4)	*M*=55.4 (*SD*=14.3)	0.2
Race				
Caucasian[b]	137 (92%)	66 (89%)	71 (94%)	0.2
Years of education	*M*=13.3 (*SD*=3.4) Range: 5–24	*M*=13.0 (*SD*=3.2)	*M*=13.6 (*SD*=3.5)	0.3
Employment				
Employed	45 (30%)	23 (31%)	22 (30%)	0.9
Marital status				
Married	79 (53%)	36 (49%)	43 (57%)	0.3
Residence				
Urban	66 (44%)	35 (50%)	31 (45%)	0.5
Duration of disease (years)	*M*=11.1 (*SD*=10.7) Range: 0.2–54	*M*=10.3 (*SD*=10.0)	*M*=11.9 (*SD*=11.3)	0.4
Number of medications taken for RA	*M*=2.5 (*SD*=1.1) Range: 1–7	*M*=2.6 (*SD*=1.2)	*M*=2.4 (*SD*=1.1)	0.2

[*]Values in the table are frequencies and corresponding percentages unless otherwise indicated.

[a]Comparisons between better and poorer perceived communication quality determined by chi-square tests of association or two sample t-tests depending on level of measurement.

[b]Participants that were not Caucasian included African Americans and Other racial groups.

Table 2

Medications Prescribed for Participants ($N = 150$)

Medication	Total sample ($N = 150$) n (%)	Higher Quality ($N = 75$) n (%)	Lower Quality ($N = 75$) n (%)	p-value for group comparison[*]
Methotrexate	101 (67.3)	50 (66.7)	51 (68.0)	0.9
Prednisone	61 (40.7)	33 (44.0)	28 (37.3)	0.4
Hydroxychloroquine	49 (32.7)	27 (36.0)	22 (29.3)	0.4
Etanercept	25 (16.7)	13 (17.3)	12 (16.0)	0.8
Adalimumab	34 (22.7)	20 (26.7)	14 (18.7)	0.2
Sulfasalazine	15 (10.0)	9 (12.0)	6 (8.0)	0.4
Leflunomide	12 (8.0)	9 (12.0)	3 (4.0)	0.07
Abatacept	10 (6.7)	4 (5.3)	6 (8.0)	0.5
Infliximab	6 (4.0)	3 (4.0)	3 (4.1)	>.9[a]
Rituximab	4 (2.7)	0 (0.0)	4 (5.3)	0.1[a]
Azathioprine	3 (2.0)	2 (2.7)	1 (1.3)	>.9[a]
Certolizumab pegol	2 (1.3)	1 (1.3)	1 (1.3)	>.9[a]

[*] P-value labeled with [a] are based on Fisher's exact test due to small expected cell counts; all others based on chi-squared test of association.

Table 3

Items with Mean Score and Standard Deviation

# Stem	Mean (SD)
Quality Communication Subscale	
Answers my questions about my health.	3.84 (0.40)
Asks me questions so that he/she understands my health problems.	3.82 (0.49)
Understands my concerns about my health condition.	3.71 (0.62)
Is concerned about my understanding of my health.	3.63 (0.69)
Pays attention to what I say about my health condition.	3.81 (0.44)
Tries to find the answers to my health problems.	3.76 (0.52)
Takes my health concerns seriously.	3.86 (0.38)
Is honest with me about my health.	3.93 (0.29)
Is patient.	3.88 (0.34)
Treats me with kindness.	3.88 (0.35)
Presents me with all of the treatment options.	3.80 (0.43)
Is knowledgeable about my health condition.	3.88 (0.35)
Explains my health condition in detail.	3.80 (0.48)
Treats me as she or he would want to be treated.	3.83 (0.42)
Approaches my treatment with a positive attitude.	3.89 (0.35)
Feel comfortable telling my health care provider about my health concerns.	3.83 (0.41)
Am able to make health-related decisions because of the information provided by my health care provider.	3.67 (0.56)
Negative Patient-Health Care Provider Communication Subscale	
Is in a hurry when he or she is seeing me.[*]	3.66 (0.84)
Makes me feel that I am bothering him/her with my medical concerns.[*]	3.74 (0.79)
Has been rude to me.[*]	3.93 (0.40)
Have avoided telling my health care provider about my health because I am afraid of what they will think or say.[*]	3.59 (0.94)

[*] Reverse coded items.

Table 4

Predictors of Perceived Quality of Patient-Provider Communication (N = 150)

Predictor	Regression Coefficient	Standarized Beta	p-value	Variance Inflation Factor
Female	−0.29	−.02	0.8	1.08
Age in years	−0.04	−.08	0.4	1.23
Caucasian race	0.93	.04	0.7	1.04
Years of education	**−0.47**	**−.25**	**0.008**	1.25
Employed	0.14	.01	0.9	1.27
Married	−1.22	−.10	0.3	1.07
Urban residence	**2.52**	**.20**	**0.04**	1.27
Duration of disease in years	−0.01	−.14	0.1	1.36
Total number of DMARDs prescribed	**1.10**	**.20**	**0.03**	1.15