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Predictors of Satisfaction With Doctor and Nurse Communication: A National Study

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ABSTRACT

Prior research indicates that effective communication between medical providers and patients is associated with a number of positive patient outcomes, yet little research has examined how ecological factors (e.g., hospital size, local demographics) influence patients' reported satisfaction with doctor and nurse communication. Given the current emphasis on improving patient satisfaction in hospitals across the United States, understanding these factors is critical to interpreting patient satisfaction and improving patient-centered communication, particularly in diverse and dense populations. As such, this study examined county-level data including population density, population diversity, and hospital structural factors as predictors of patient satisfaction with doctor and nurse communication. Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), U.S. Census data, and number of hospital beds were obtained from publicly available Hospital Compare, U.S. Census, and American Hospital Directory websites, respectively. Multivariate regression modeling was performed for the individual dimensions of HCAHPS scores assessing doctor and nurse communication. Standardized partial regression coefficients were used to assess strengths of county-level predictors. County-level factors accounted for 30% and 16% of variability in patient satisfaction with doctor and nurse communication, respectively. College education ($\beta = 0.45$) and White ethnicity ($\beta = 0.25$) most strongly predicted a favorable rating of doctor and nurse communication, respectively. Primary language (non-English speaking; $\beta = -0.50$) most strongly predicted an unfavorable rating of doctor communication, while number of hospital beds ($\beta = -0.16$) and foreign-born ($\beta = -0.16$) most strongly predicted an unfavorable rating of nurse communication. County-level predictors should be considered when interpreting patient satisfaction with doctor and nurse communication and designing multilevel patient-centered communication improvement strategies. Discordant findings with individual-level factors should be explored further.

Across multiple studies, effective patient–physician communication has been linked with increased patient satisfaction, compliance with treatment, understanding of information, and health status/psychiatric comorbidity (Ong, De Haes, Hoos, & Lammes, 1995). Due to the critical role that effective communication plays in improving patients' care and health outcomes, the Patient Protection and Affordable Care Act of 2010 mandates that Centers for Medicare and Medicaid Services (CMS) payments to hospitals must depend, in part, on metrics that assess patient satisfaction with communication and quality of care. Payments depend on measures that assess quality and efficiency of health care being provided in order to provide value-based health care (Florence, Atherly, & Thorpe, 2006). For instance, the CMS-directed Hospital Value-Based Purchasing (HVBP) program is responsible for 2% of total CMS reimbursements to hospitals (Blumenthal & Jena, 2013) and will similarly contribute to physician payments through Physician Value-Based Purchasing, which is currently being rolled out. Importantly and related to communication, HVBP is composed of distinct “domains.” One such domain includes the “Patient Experience of Care”

domain, which assesses patient satisfaction as determined by patients who complete Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) surveys upon hospital discharge (Centers for Medicare and Medicaid Services, 2013; Fann et al., 2008). This measure is used to determine 30% of HVBP reimbursements to hospitals and includes measures of satisfaction with doctor and nurse communication. Therefore, patients' self-report of satisfaction now directly affects CMS payments for over 3,000 hospitals across the United States (85% of all U.S. hospitals). Although public reporting of hospital patient satisfaction has slightly increased patient satisfaction with communication since 2007, there continues to be wide regional variation (Mann, Siddiqui, Kurbanova, & Qayyum, 2015).

Prior research has focused on the role of patient-level factors in predicting satisfaction with doctor and nurse communication. This research indicates that in most circumstances, patients prefer patient-centered communication as opposed to doctor-centered or directed communication (Mead & Bower, 2000). Communication is inextricably tied to patient-centeredness and is a key element of multiple

models of the patient-centered approach (Laine & Davidoff, 1996; Stewart et al., 2003), yet there are gaps in the provision of patient-centered communication and care across hospitals and demographics in the United States (Andrulis, 1998; Makuc, Breen, & Freid, 1999; Schulman et al., 1999).

Prior research indicates the influence of patient-level factors on patients' reported satisfaction with communication, whereas it is likely that county-level factors are associated with patients' reported satisfaction with communication (Glass & McAtee, 2006). Specifically, patient-rated satisfaction with communication may be mediated by place-based "ecological factors" (e.g., hospital- and county-based demographics; Becker & Douglass, 2008; Kvist, Voutilainen, Mantynen, & Vehvilainen-Julkunen, 2014). For instance, ecological factors such as population density, rates of minorities or non-English-speaking individuals within a county, or the number of hospital beds (as an indicator of hospital size) may all influence, either directly or via mediators, patient-level ratings of satisfaction with communication from medical providers. Because these ecological factors may be critical to understanding areas of greatest need for improvements in communication as well as areas that may need adjustments for HCAHPS scores that influence HVBP (Elliott et al., 2009; O'Malley, Zaslavsky, Elliott, Zaborski, & Cleary, 2005), it is critical to understand the influence of county-based and hospital-based ecological factors on patient-level ratings of provider communication. U.S. Census-based demographic data and nationwide patient satisfaction scores (as part HCAHPS; a critical domain of HVBP) provide a unique opportunity to evaluate the role of ecology or "place" on patient-level satisfaction scores with doctor and nurse communication.

A number of county- and hospital-level factors may mediate patient-level ratings of communication, including population density and race and ethnicity of patient populations (Borah et al., 2012; Cooper & Powe, 2004; Jha, Orav, Zheng, & Epstein, 2008). Providing support for this framework, past research indicates that overall patient satisfaction scores (as measured by HCAHPS) are lower in areas of highest demographic diversity and population density, primarily due to the lower nurse to patient staffing ratios that result in reduced quality of care (Jha et al., 2008). Additionally, higher HVBP scores are associated with hospital-based characteristics such as for-profit status, smaller number of hospital beds, and location in certain areas of the United States (Borah et al., 2012), whereas lower HVBP scores have been shown to vary by geographic area (Jha et al., 2008). Given these prior findings, it is possible that number of hospital beds (as a measure of hospital size) may also predict patients' ratings of communication. Determining the association of county-level and hospital-level factors as predictors of patient-level ratings of communication could provide clearer insight into what areas and types of hospitals should be targeted for improvements in communication.

Another potential factor that may influence patient-level ratings of communication across counties is the proportion of patients who are poor and/or underrepresented minorities in a given geographical area (e.g., county). Prior research indicates that hospitals serving the poor are more likely to score lower on HVBP (Borah et al., 2012), which could be due to a number of factors, including race,

ethnicity, or socioeconomic status. Supporting this hypothesis, prior research indicates that patients in racially concordant pairings with physicians have higher quality of communication than those in racially discordant relationships (Cooper & Powe, 2004; Cooper et al., 2003). Based on these prior findings, it is critical to understand the influence of county-level and hospital factors on patient-level ratings of satisfaction with care to determine which of these county-level variables predicts patient-level ratings of communication.

To address this critical need, this study evaluates patient satisfaction with doctor and nurse communication in all HCAHPS-participating hospitals across the United States to capture the role of county-level demographic and structural factors (i.e., number of hospital beds). Routine assessment of patient satisfaction with doctor and nurse communication signals a policy priority for delivering patient-centered care. As such, it presents an opportunity to assess current gaps in the quality of medical communication by addressing the role of place in patients' satisfaction with communication. It is critical to understand county-level demographic and structural factors in order for hospitals to best facilitate patient-centered communication. Given previous analyses of individual hospital-based data (Borah et al., 2012; Elliott et al., 2009; Jha et al., 2008; O'Malley et al., 2005), our hypothesis is that large-scale aggregated data on a county level will indicate that demographic diversity (ethnicity, race), higher population density, and larger hospitals will be associated with lower levels of patient-reported satisfaction with doctor and nurse communication.

Methods

Data collection

All data analyzed in the present study were obtained from publicly available data sets described in the following. Analyses examined county-level variables (demographics and hospital demographics) as predictors of patient-level ratings of satisfaction with communication. County-level predictors were extracted from U.S. Census data. Patient-level measures of doctor and nurse communication were obtained from the publicly available Hospital Compare Consumer Assessment of Healthcare Providers and Systems (HCAHPS) (Giordano, Elliott, Goldstein, Lehrman, & Spencer, 2010), which is designed to assess patients' assessments of hospital care.

County-level predictors (U.S. Census data)

Publicly available data were obtained from Hospital Compare (Centers for Medicare and Medicaid Services, 2013), American Hospital Directory (American Hospital Directory, Inc., 2013), and the U.S. Census Bureau (U.S. Census Download Center, 2013) websites. Twenty U.S. Census data categories were selected by their relevance for this study out of the 50 publicly reported U.S. Census categories. Final variables utilized in this regression model included the following: county population, county population density, percent of population change over 1 year, poverty level (percent), income level per capita, median household income, average

household size, average travel time to work, percentage of high school or college graduates, percentage of non-English primary language spoken at home, percentage of residents born outside of the United States, population percentage in same residence for over 1 year, gender (percent female), race (White alone, White alone [not Hispanic or Latino], Black or African American alone), percent of population over 65 years, and percent of population under 18 years.

Patient-level outcomes (doctor and nurse communication)

As noted, doctor and nurse communication were measured using the HCAHPS survey (Giordano et al., 2010). The HCAHPS survey is a publicly available standardized survey instrument used to measure patients' perspectives on hospital care. It is 32 questions in length, comprised of 10 evaluative measures, and includes two items that assess patients' satisfaction with doctor and nurse communication. The HCAHPS survey is provided to a random sample of patients across the United States throughout the year at 48 hours to 6 weeks after discharge from the hospital. All short-term, acute-care, non-specialty hospitals are invited to participate in the HCAHPS survey, and these results, which are analyzed in the present study, are publicly available.

Analytic plan

Preliminary analyses were run in order to verify that all data met statistical assumptions, including normality, linearity of relationships, and full range of scores. Both patient-level (HCAHPS) and county-level (U.S. Census data) variables were analyzed to assess their distribution curves. The category of population densities (per county) was converted to a logarithmic scale to account for a skewed distribution and long tail in the area of low population density. Data were subsequently merged into one Excel spreadsheet using the VLOOKUP function such that relevant 2010 Census county-level data were added to each hospital's patient-level data (HCAHPS).

Bivariate analyses were conducted to determine which U.S. Census categories were significant predictors for doctor and nurse communication, respectively. All significant predictors were then included in two separate multivariate models that predicted doctor and nurse communication. Goodness of fit, which indicates the appropriateness of these models, was assessed by determinates of correlation (adjusted R^2). Statistically significant predictor variables for overall patient satisfaction scores were then ranked according to their partial regression coefficients (standardized β). All analyses were two-tailed, and statistical significance was set at $\alpha = .05$.

Results

Complete HCAHPS scores were obtained from 3,907 hospitals out of a total of 4,621 (85%) U.S. hospitals. The majority of hospitals (73.8%, $n = 2,884$) collected more than 300 surveys; fewer (17.8%, $n = 696$) collected 100–299 surveys, and a small number of hospitals (8.4%, $n = 327$) collected fewer than 100 surveys. Based on the most conservative

estimate, results were available from at least 934,800 individual surveys. Missing HCAHPS hospital data averaged 13.4 ($SD = 12.2$) hospitals per state. County-level data were obtained from all 3,144 counties or county equivalents across the United States (100%).

Bivariate analyses

Before conducting county-level analyses, an initial preliminary analysis was conducted to examine whether state population density was associated with levels of patient satisfaction with communication. In line with our hypothesis, this preliminary analysis indicated that greater individual U.S. state population density (with District of Columbia excluded) was significantly correlated with lower levels of patient satisfaction with doctor communication ($r = -0.123$, $p = .013$) (see Figure 1), but was not significantly associated with patient satisfaction with nurse communication.

On the county level, univariate regression curve estimations, shown in Figure 2, indicate a significant association between doctor communication and nurse communication and each one of the following individual factors: number of hospitals beds, population density, ethnicity (White alone), and gender (percentage of females total).

Multivariate analyses

Two multiple linear regression models were run in which 20 county-level demographic and hospital factors were examined as predictors of doctor communication and nurse communication, respectively. The first model, which examined county-level predictors of doctor communication, explained 30% of the variability in patients' ratings of doctor communication ($R^2 = .30$, $p < .0001$). In total, 12 of the 20 U.S. Census variables were statistically significant predictors of doctor communication (see Table 1). The second model, which examined county-level predictors of

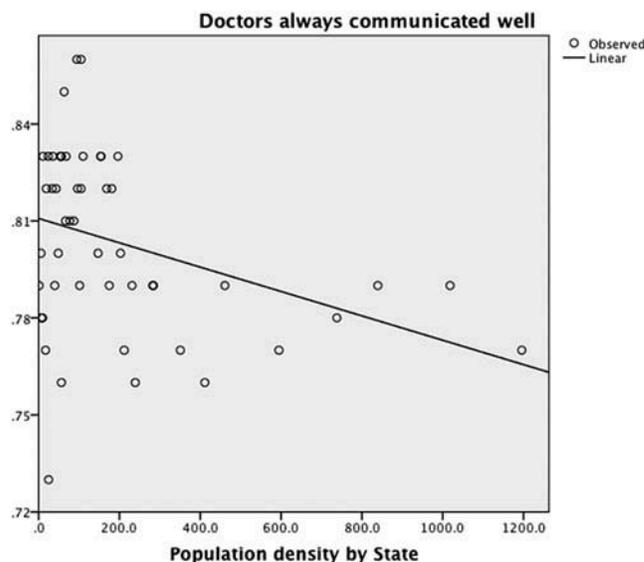


Figure 1. Fraction of positive HCAHPS doctor communication scores to the question "My doctor always communicated well" (y axis) correlated with state population density (x axis).

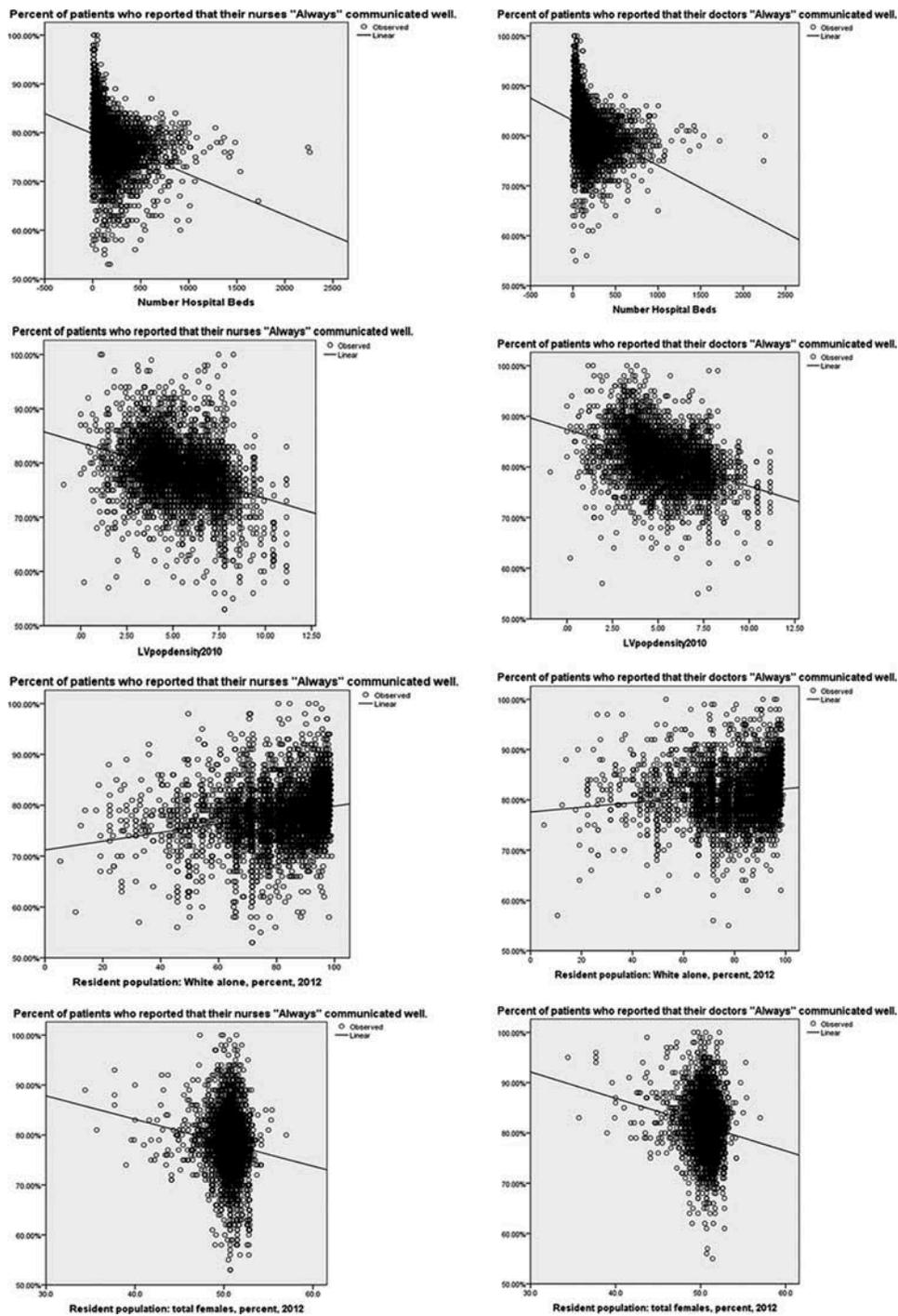


Figure 2. Curve estimation scatterplots for select bivariate analyses examining relationship between county-level predictors and doctor communication and nurse communication. The left column represents the dependent variable “nurse communication” and the right column represents the dependent variable “doctor communication.” Each box represents a separate independent variable in the descending order of number of hospital beds, population density, “White alone” ethnicity, and percent of total females. Each dot on the scatterplot represents an individual hospital ($N = 3,907$ hospitals).

nurse communication, explained 25% of the variability in patients’ ratings of nurse communication ($R^2 = .25, p < .0001$). In total, 12 of the 20 U.S. Census variables were statistically significant (see Table 2). College education and White ethnicity most strongly predicted a favorable rating of doctor communication and nurse communication, respectively. Primary language (non-English speaking) most strongly predicted an unfavorable rating of doctor communication. Number of hospital beds and percent foreign-

born most strongly predicted an unfavorable rating of nurse communication.

Discussion

This study provides a representative sample of U.S. hospitals that can be used to define county-level trends (using U.S. Census data) in patient satisfaction with communication

Table 1. Multivariate regression predicting doctor communication (HCAHPS scores) from county- and hospital-level demographics.

Variable	Regression coefficient (SE)	Beta	t Value
Percent with bachelor's degree	.10 (.23)	.45	12.02***
Percent of population under 18 years	.05 (.25)	.15	5.60***
Percent foreign-born	.03 (.07)	.14	2.87**
Percent 1-year same residence	.03 (.15)	.12	5.92***
Percent of White alone	.01 (.03)	.09	2.10*
Per-capita income	-.03 (.00)	-.00	-.506
Percent of African American alone	-.12 (.01)	-.04	-1.245
Percent total female	-.07 (-.21)	-.06	-3.19**
Population percent change	-.03 (.05)	-.07	-1.349
Average travel time to work	-.08 (.02)	-.08	-3.716
Population (county)	-.00 (.00)	-.08	-4.08***
Percent of population age 65 years and over	-.04 (-.19)	-.14	-5.30***
Average household size	-.64 (-3.16)	-.15	-4.96***
Number of hospital beds	-.00 (-.01)	-.19	-12.25***
Percent White, not Hispanic/Latino	-.02 (-.05)	-.20	-3.15**
Percent of poverty level	-.04 (-.23)	-.24	-6.64***
Population density	-.07 (-.77)	-.28	-10.87***
Average household income	-.00 (.00)	-.35	-7.93***
Percent with high school degree	-.02 (-.33)	-.40	-13.75***
Percent non-English-speaking	-.02 (-.17)	-.50	-7.62***
Model statistics	$F(1, 17) = 98.5, p < .001$		
Adjusted R^2	.30		

Note. HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2. Multivariate regression predicting nurse communication (HCAHPS scores) from county- and hospital-level demographics.

Variable	Regression coefficient (SE)	Beta	t Value
Percent of White alone	.01 (.09)	.25	8.29***
Percent of African American alone	.01 (.08)	.19	5.90***
Percent with bachelor's degree	.02 (.11)	.19	5.08***
Percent of population under 18 years	.09 (.05)	.16	3.11
Percent 1-year same residence	.03 (.18)	.13	6.94***
Percent White, not Hispanic/Latino	.06 (.02)	.02	.846
Average household income	-.12 (.00)	-.00	.038
Percent total female	-.07 (-.19)	-.05	-2.86**
Average household size	-.58 (-1.09)	-.05	-1.86
Population (county)	-.00 (.00)	-.06	-3.34**
Population density	-.08 (-.22)	-.07	-2.62**
Per capita income	-.00 (.00)	-.07	-2.11*
Percent with high school degree	-.02 (-.08)	-.09	-3.42**
Average travel time to work	-.02 (-.12)	-.10	-5.09***
Percent non-English-speaking	-.02 (-.04)	-.12	-2.56*
Percent of population age 65 years and over	-.04 (-.20)	-.14	-5.79***
Percent of poverty level	-.13 (.04)	-.14	-3.487
Number of hospital beds	-.00 (-.01)	-.16	-9.90***
Percent foreign-born	-.03 (-.09)	-.16	-3.38***
Population percent change	-.06 (.06)	-.18	-3.144
Model statistics	$F(1, 15) = 85.383, p < .001$		
Adjusted R^2	.25		

Note. HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems.

* $p < .05$, ** $p < .01$, *** $p < .001$.

(HCAHPS). These models demonstrate nonrandom variability of patient satisfaction with doctor communication and nurse communication across the United States, even after CMS patient-mix adjustment. The county-level variables of college education and White ethnicity were most strongly associated with patient satisfaction with physician and nurse communication, respectively. Non-English-speaking patients and number of hospital beds were most strongly associated with dissatisfaction with physician communication and nurse

communication, respectively. The results in the present study also indicate that several county-level factors may mediate patient satisfaction with doctor communication and nurse communication. Future research in this area should include a formal mediation analysis.

Overall, this study highlighted the magnitude of health inequities in the United States, but there were several trends at the aggregate county level that are not consistent with individual-level (i.e., patient-level) data. For instance, education at the county level was associated with greater satisfaction with communication in this study, but it has been shown to predict worse overall patient satisfaction at the individual level in prior research (Elliott, Swartz, Adams, Spritzer, & Hays, 2001). This difference may be due to a closer match in educational levels between patients and their nurses and doctors. Additionally, advanced age at the county level was associated with worse satisfaction with communication but generally has been found to predict greater overall patient satisfaction at the individual level (Elliott et al., 2001; Jackson, Chamberlin, & Kroenke, 2001). This may be due to the fact that hospitals serving the poor and elderly tend to score worse in HVBP, which may influence communication ratings directly or via an unknown but associated mediating factor (Borah et al., 2012).

To better understand the reason that patient communication ratings differ by geographical area (Jha et al., 2008), we examined a number of potential factors, including race, ethnicity, and socioeconomic status, that also vary by geographical area. This study found no significant association between county-level socioeconomic status and satisfaction with communication, whereas previous studies found a positive association at the individual-level (Hall & Dornan, 1990). Consistent with prior research (Harmsen, Bernsen, Bruijnzeels, & Meeuwesen, 2008), our study found that linguistic minority status at the county level was associated with worse satisfaction with communication than was ethnicity. This finding represents an increasingly important unmet health care need. The negative predictive power of linguistic minority status, independent of race and ethnicity, is similar to findings by the Weech-Maldonado (2003) evaluation of general patient satisfaction with multiple categories of medical care. The present study results also indirectly indicated that Hispanics rate communication highly at the county level. This finding may be due to "extreme response tendency" as noted in previous studies (Weech-Maldonado, Elliott, Oluwole, Schiller, & Hays, 2008; Weech-Maldonado, Fongwa, Gutierrez, & Hays, 2008). Similarly, on an individual level, African Americans and Hispanics have been shown in other studies to measure overall satisfaction higher than Caucasians (Dayton, Zhan, Sangl, Darby, & Moy, 2006; Weech-Maldonado, Elliott et al., 2008). As such, the same minority reporting bias may be reflected in these HCAHPS communication patient satisfaction scores, in which case these patients would be reporting higher satisfaction with communication that does not actually reflect a higher quality of communication and is consistent with known racial inequities of care.

Several factors were statistically significant but contributed less to the multivariate models and may not be considered

clinically meaningful. These variables could be organized into trends that were seen with education, age, gender, race, finances, and size of place in the counties in which hospitals serve. For example, across counties there was a U-shaped curve with respect to education. Both counties with higher levels of college graduates and counties with lower levels of high school educated individuals had higher levels of patient satisfaction with physicians. However, those counties with higher levels of high school graduates had lower levels of satisfaction. One could speculate that patients who attend hospitals in counties with low rates of high school graduates may not be willing to challenge the physicians' communication, whereas high school graduates may perceive the threat of not understanding the physician and be dissatisfied. Counties with higher percentages of females were less satisfied with both doctor communication and nurse communication. Although this finding was not a strong predictor in either multivariate model, this relationship may stem from more frequent medical encounters at a younger age and greater subsequent scrutiny. Hospitals in counties with higher populations under 18 years old had higher patient-level satisfaction with communication, which could reflect the satisfaction of hospitals in counties with a higher percentage of families or groups of people who are less likely to come in frequent contact with hospitals. There appears to be a trend toward less satisfaction with communication in hospitals in areas that have higher income earnings, larger households, longer commutes to work, higher populations, and greater population density. These trends may reflect hospital satisfaction in counties with higher numbers of working professionals and crowding (of both community and household) of urban areas where more employment opportunities exist but with higher rents.

The idea that a socioecological framework may affect health outcomes, and therefore patient satisfaction with health care, has been developed and explored previously and forms the conceptual basis for both conducting and interpreting the outcomes to this study (Macintyre, Ellaway, & Cummins, 2002). This type of research has become increasingly utilized for understanding the relative importance of psychosocial, material, and ecological factors contributing to health outcomes, especially among minorities (Krieger, 2000). However, the interpretation of our results may be tempered by considering the "ecological fallacy," which may occur when inferring individual relationships from relationships observed at the aggregate level (i.e., county- and hospital-level demographics; Robinson, 2009). Even the direction of correlation can vary at times between ecological (i.e., county) and individual (i.e., hospital) levels, and inference about causation should be scrutinized. Therefore, our study is limited by the facts that county-level demographics were used in place of actual hospital demographics and that the present data are correlational in nature, preventing us from inferring causation. The assumption is that across the entire United States, the majority of hospitals serve populations in their own counties. However, several variations may exist depending on hospital type, insurance payers, and county population. The strength of this study is in its sheer numbers to approximate trends. This "ecological fallacy" may partially explain the study's findings that run counter to known individual-level

associations about patient satisfaction and communication. Another limitation is the use of a single item measure to account for patient satisfaction with either doctor communication or nurse communication. This limitation is countered by the fact that these single-item measures are currently being used to determine patient satisfaction outcomes. A further limitation is that not all hospitals collected the same number or percentage of surveys, or had the same survey response rate. However, the majority of hospitals collected more than 300 surveys (73.8%). Smaller hospitals tended to collect fewer than 300 surveys but had higher survey response rates.

Although patient-level interactions are probably more important for determining patient satisfaction with communication, larger contextual-level factors such as where the interaction is taking place also contribute to the patients' satisfaction or dissatisfaction (Sloggett & Joshi, 1994). The interpretation of patient satisfaction with communication is complicated by multiple broad outlying factors that may only be visible from a bird's-eye view and go unnoticed on the individual patient or hospital level. These larger trends need to be further explored in order to meet our modern health care communication challenges in a multiethnic and varied patient population in the United States.

Although many of these county level factors are not necessarily changeable and most U.S. health care practices are constrained by time and finances, incorporating person-centered communication into the practice of medicine is attainable and has economic incentives (Hall & Lord, 2014). Therefore, these county-level factors should represent an important sought-after component of HVBP (Blumenthal & Jena, 2013). This is consistent with the increasingly recognized contribution of multiple, nonmedical determinates to health outcomes (McGovern, Miller, & Hughes-Cromwick, 2014). A major hurdle in improving patient care is the lack of accountability for delivering patient-centered care. Physicians treating Medicaid patients reported that their incomes were primarily related to productivity (68%) and much less to patient satisfaction (21%), quality (19%), or resource use (14%) (Chen, Chin, Alexander, Tang, & Peek, 2014). This may be changing with the introduction of value-based reimbursement and may translate into a focused way to provide patient-centered care on the individual level.

Communication interventions to promote patient-centered care effectively transfer patient-centered skills to providers across multiple studies (Dwamena et al., 2012). Although there is not a direct one-to-one relationship between patient satisfaction and patient-centeredness, provider-based communication skills could certainly be targeted to specific doctor-patient/nurse-patient encounters. A patient-centered, as opposed to doctor-centered, style of communication is preferred by most patients and forms an essential part of overall patient satisfaction (Mazor et al., 2013). Mead and Bower (2000) defined five conceptual dimensions of patient-centeredness that could be incorporated into a communication intervention: (a) bio-psychosocial perspective; (b) "patient-as-person"; (c) sharing power and responsibility; (d) therapeutic alliance; and (e) "doctor-as-person." Patient-centered communication directed at patient groups who rate satisfaction with communication poorly (e.g., linguistic minorities, less educated) could be enhanced through

communication training programs and could simultaneously increase revenue through HVBP. For example, results from this study could be used to encourage communication skills for physicians using translator phones during patient encounters with non-English-speaking patients, who tend to rate physician communication poorly on individual-level studies as well (Carrasquillo, Orav, Brennan, & Burstin, 1999).

An effort to make the health care system work for all people in the heterogeneous makeup of the United States is forthcoming but represents an enormous challenge. Universal assessments of patient satisfaction clearly have the potential to highlight impoverished demographic areas of health care communication that could be amenable to targeted communication interventions.

Conclusion

Economic incentives such as HVBP should place greater attention on patient-centered communication. This analysis of a HCAHPS data highlights disparate patient satisfaction trends with health care communication. County-level demographic and structural factors (i.e., number of hospital beds) determinate of place appear to influence patient-level satisfaction with communication and may mediate patient-provider communication on an individual level, although results should be interpreted cautiously. These large trends in patient satisfaction may be used to direct communication-training efforts for medical professionals to enhance person-centered care directly and patient satisfaction indirectly.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Author DCM contributed to the design of the study, performed the statistical analysis, and drafted the article. Author MJS participated in its design and coordination and helped to draft the article. Author RFH conceived of the study and participated in its design and coordination and helped to draft the article.

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