Patient-Centered Care: The Influence of Patient and Resident Physician Gender and Gender Concordance in Primary Care

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Abstract

Background: Patient-centered care (PCC) is thought to significantly influence the process of care and its outcomes and has been identified as part of a comprehensive strategy for improving our nation's healthcare delivery system. Patient and physician gender, as well as gender concordance, may influence the provision of PCC.

Methods: Patients (315 women, 194 men) were randomized to care by primary care resident physicians (48 women, 57 men). Sociodemographic information, history of health risk behaviors (tobacco use, alcoholism, and obesity), and self-reported global pain and health status were collected before the first visit. That visit and subsequent patient visits to the primary care physician (PCP) were videotaped during the year-long study period. PCC was measured by coding all videotapes using a modified version of the Davis Observation Code.

Results: No significant gender differences in PCC were found between the male and female patients; however, female physicians provided increased PCC to their patients. The greatest amount of PCC was seen in the female patient-female physician gender dyad. Regression analyses, controlling for other patient variables, confirmed that female concordant dyads were associated with a greater amount of PCC. There was no significant relationship for the male patient-male physician concordance (vs. disconcordance).

Conclusions: These findings highlight the influence of gender in the process of care and provision of PCC. Gender concordance in female patient-female physician dyads demonstrated significantly more PCC. Further research in other clinical settings using other measures of PCC is needed. A public mandate to provide care that is patient-centered has implications for medical education.

Introduction

THE INSTITUTE OF MEDICINE (IOM) has presented a strategy for improving the quality of our nation's healthcare delivery system in the 21st century. One of the main areas for improvement was identified as a need for "patient-centeredness."[1] This was described as healthcare that is respectful and responsive to patient needs, values, and preferences and encourages shared clinical decision making.

Patient-centeredness is increasingly being considered a proxy for high-quality personal care, and researchers have sought to link this approach with improvements in the process of care and its outcomes. Although patient-centered care (PCC) has been associated with improved patient health outcomes, there is still a need for more consistent research in this area.[2–7] Several studies have demonstrated an association between PCC and patient satisfaction[8–13]; however, others

have failed to confirm this relationship.[14–17] There is preliminary evidence for an association between patient-centered communication and the use of healthcare resources. It has been reported that patients who perceived that their visit had been patient-centered received fewer diagnostic tests and referrals in the subsequent 2 months.[4] Others have demonstrated that physicians who had visits with standardized patients characterized by greater amounts of patient-centered communication also had lower expenses for diagnostic testing.[18] We recently reported that PCC in the primary care setting was significantly associated with decreased use of healthcare services and subsequent lower total annual charges.[19]

There are numerous studies that provide compelling evidence for the influence of both patient and physician gender[20–29] and patient-physician gender concordance[21,30–35] on the physician-patient interaction and the process of care.

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Both patient and physician gender impact the process of medical care. Female patients have been demonstrated to ask more questions, get more information, receive more counseling and preventive services, and have more participatory visits than male patients.[20–23] These behaviors are all elements of a patient-centered interaction. Male and female physicians have also been found to have different communication styles during medical encounters. Female primary care physicians (PCPs) engage in more information sharing, discussion of psychosocial topics, partnership building, and encouragement of patient participation in their interactions with patients.[24–29] Taken together, these behaviors represent a patient-centered communication style, reflecting a closer aligned therapeutic environment of greater engagement and partnership.[26] Male physicians, on the other hand, tend to devote more time to technical practice behaviors, such as history taking.[22–29]

There are reports suggesting that gender concordance and discordance, in same-gender and opposite-gender patient-physician dyads, also influence the provision of PCC.[21,30–35] Female patients seen by female physicians have been observed to have the highest patient-centered scores for their visits compared to female patients seeing male physicians and male patients seeing either female or male physicians.[30]

We sought to contribute to the findings of previous studies examining the influence of patient and physician gender and gender concordance on the provision of PCC. By controlling for patient sociodemographic characteristics, health risk behaviors, pain, and mental and physical health status, which all have previously been demonstrated to impact the patient-physician interaction, we hoped to decrease possible sources of bias that may have been present in other studies.[17,21,29,36–44] Based on the literature and our own previous research findings, we hypothesized that female patients would be more likely than male patients to have visits incorporating PCC, female physicians would have more patient-centered practice style behaviors than male physicians, and the greatest amount of patient-centered medical care would be seen in gender concordant dyads between female patients and female physicians.

Materials and Methods

Study subjects

This was part of a larger study examining physician practice styles and associated patient outcomes in family medicine and internal medicine resident physicians. The study population consisted of new patients calling for outpatient appointments at a university ambulatory care center. Of the first 956 nonpregnant adults without a preference for a specific physician or specialty who called for an appointment after the study began, 821 (85%) agreed to participate. These patients were then randomly assigned for primary care at either the family practice clinic or the general medicine clinic. Three hundred twelve (38%) of these patients were excluded because they did not keep their appointment or could not be included in the study for scheduling reasons. A total of 509 patients (315 women and 194 men) participated in the study, providing informed consent as required by the institutional human subjects review committee. Medical care was provided by 26 family practice and 79 general internal medicine second and third year residents. These 105 primary care physicians (48 female and 57 male) each saw an average of 4.8 patients (standard deviation [SD] 4.6 patients). The female physicians saw 135 female and 49 male patients, and the male physicians saw 180 female and 145 male patients. It should be noted that the curricula in both the family practice and internal medicine residency programs follow the general requirements for residency training. Any relative differences in general behavioral medicine training should have been controlled through the randomized assignments of new patients to the two clinics.

Study design

Before the initial visit with their primary care provider, patients were interviewed in order to collect sociodemographic information, history of tobacco use, screening for alcoholism using the Michigan Alcohol Screening Test (MAST), global pain using the Visual Analog Pain Scale, and self-reported health status using the Medical Outcomes Study Short Form-36 (MOS SF-36). Height and weight were also measured in order to calculate the patient's body mass index (BMI). Physicians were not provided with previsit interview patient data in order to avoid influencing their behavior. The entire medical visit was then videotaped in examination rooms equipped with discreet wall-mounted video cameras. Subsequent patient visits to their primary care providers were videotaped throughout the course of the 1-year study period.

Study measures

The BMI is the recommended method for measuring obesity in clinical settings and is calculated as weight in kilograms divided by the square of height in meters.[45] Patients were designated nonsmokers if they reported that they had never smoked or had not smoked tobacco for ≥15 years; this was based on a recent report by the Surgeon General on the health consequences of smoking and the benefits of quitting.[46] The short version of the MAST was used to detect alcoholism; this has been shown to be a reliable screening instrument in detecting alcoholism in both clinical and nonclinical settings.[47] The Visual Analog Pain Scale, measuring the level of global pain experienced at the time of the medical visit, is widely used in research monitoring pain levels as an explanatory variable or outcome measure.[48,49] The MOS SF-36 is a reliable and valid 36-item questionnaire made up of eight scales (general health, physical function, physical role, mental role, social function, pain, energy, and mental health) that is scored so that higher scores reflect better health status.[50,51] Summary measures describe a physical component score (PCS) and a mental component score (MCS).[52,53]

PCC was measured by coding the videotapes using a modified version of the Davis Observation Code (DOC) (Table 1).[54] DOC is a reliable and valid interactional analysis system (consisting of 20 clinically relevant behaviors) that has been used previously to describe physician practice style differences in a variety of previous studies.[36–44, 54–61] Different clusters of physician practice behaviors have also been identified to characterize practice styles based on an evaluation of the clinical and statistical relationships among the 20 DOC codes. These practice behavior clusters include from 1 to 8 of the DOC-coded behaviors: Technical, Health Behavior, Addiction, Patient Activation, Preventive Services, and Counseling.

TABLE 1. INDIVIDUAL DAVIS OBSERVATION CODES AND CLUSTERS

Codes in each cluster[a]	Abbreviated definitions of codes
Patient Activation Cluster	
Health knowledge	**Physician asking or patient spontaneously offering what patient knows or believes about health and disease**
Patient question	**Patient asking question**
Chatting	**Discussion of topics not related to current visit**
Counseling Cluster	
Counseling	**Physician discussing interpersonal relations or current emotional state of patient or patient's family**
Technical Cluster	
Structuring interaction	Discussed what is to be accomplished in current interactions
History taking	Physician inquiring about or patient describing details related to the current complaint or to prior illnesses
Family information	**Discussing family medical or social history and/or current family functioning**
Physical examination	Any aspect of physical examination of patient
Evaluation feedback	Physician telling patient about results of history, physical, laboratory work, and so on
Planning treatment	Physician prescribing a medication, diagnostic, or treatment plan
Treatment effects	**Physician inquiring about or patient describing result of ongoing therapeutic intervention**
Procedure	Any treatment or diagnostic procedure done in office
Health Behavior Cluster	
Compliance	Discussing previously requested behavior
Health education	Physician presenting information regarding health to patient
Health promotion	Physician asking for change in patient's behavior in order to increase or promote health
Nutrition	**Any question or discussion about nutrition**
Exercise	**Any question or discussion about exercise**
Addiction Cluster	
Substance use	Any question or discussion of drinking alcohol or use of other substances
Smoking behavior	Any question about or discussion of smoking or use of tobacco
Preventive Service Cluster	
Preventive service	Physician discussing, planning, or performing any screening task with disease prevention

[a]Patient-centered codes are bold.

Grounded in PCC theory and literature, we created a modified DOC PCC interactional analysis system (bold in Table 1). Mead and Bower[62] characterized the patient-centered approach as a multifaceted construct differing from the traditional biomedical approach in several key ways, each focusing on a specific aspect of the doctor-patient interaction: understanding the patient's illness within a broader biopsychosocial context, appreciating the patient's experience of illness, advocating for an egalitarian relationship, creating a therapeutic alliance, and acknowledging the impact of the participants' personal qualities on the medical encounter. These key dimensions of PCC were considered when including the specific DOC items in our modified instrument measuring PCC. Because the establishment of an egalitarian relationship and therapeutic alliance is such an important element of PCC, we selected the DOC behaviors included in the Patient Activation Cluster (Health knowledge, Patient question, and Chatting). Chatting also reflects a portion of the influence of the physician's and patient's personalities on the interaction. Counseling was also included to identify psychosocial issues impacting the patient. The Treatment effects code seeks to measure how the illness and its treatment affect the patient. This differs from the Compliance item, in which the emphasis is on whether the patient is adherent with what the physician has previously instructed him or her to do. The Nutrition and Exercise codes focus on patient lifestyle and are an exchange of information between doctor and patient, as contrasted with Health promotion, in which the physician asks for a specific change in the patient's behavior.

The number of successive 15-second intervals in which these 8 PCC codes were observed was expressed as a percentage of the total number of DOC-coded behaviors, reflecting the relative emphasis on PCC during the visit. To determine the presence of any observer bias, approximately 20% of the videotapes were coded by a second observer, with a stratified kappa coefficient of agreement of 91.6%.[63]

Statistical analyses

Regression models were estimated to investigate the association of PCC with patient and physician gender by controlling for variables previously found to impact medical encounters, such as patient age, education, race, income, obesity, smoking status, alcohol abuse, global pain, mental health status, and physical health status. Gender concordance between patient and physician was also studied as an explanatory variable in subsequent analyses.

Results

There were 509 study participants, including 315 (62%) women and 194 (38%) men. Mean age and education were 41.74 years and 12.61 years, respectively. The patients were 62.67% white and 37.33% nonwhite. Over 80% of the patients had incomes < $30,000. The mean BMI was 29.76 (just below

TABLE 2. SOCIODEMOGRAPHIC, HEALTH VARIABLES, AND PATIENT-CENTERED CARE DATA FOR WOMEN AND MEN

Patient characteristics[a]	Women (n = 315)	Men (n = 194)	p
Age, mean years (SD)	41.06 (14.32)	42.83 (15.34)	0.1887
Education, mean years (SD)	12.40 (02.71)	12.94 (02.74)	0.0298
Ethnicity, %			0.1525
Nonwhite	34.92	41.24	
White	65.08	58.76	
Income, %			0.0002
< $10,000	55.27	39.06	
$10,000–$19,999	25.56	23.44	
$20,000–$29,999	08.31	14.06	
$30,000–$39,999	04.79	08.33	
$40,000–$49,999	03.19	05.73	
≥ $50,000	02.88	09.38	
BMI, mean	30.40 (08.97)	28.72 (07.25)	0.0213
Smoker, %[b]	64.65	73.06	0.0493
Alcohol abuse, %[c]	05.10	11.92	0.0051
Global pain, mean	46.44 (30.65)	32.50 (29.81)	< 0.0001
Mental health status[d] (MCS), mean	41.99 (12.66)	47.24 (10.65)	0.0001
Physical health status[d] (PCS), mean	39.25 (11.82)	42.38 (11.75)	0.0038
Patient-centered care over 1 year, %	15.57	15.30	0.6258

Two-tailed Student t tests and chi-square tests were used.
[a]There were no statistically significant differences in patient characteristics among patients seen by male and female residents.
[b]Patients were considered nonsmokers if they had never smoked or had not smoked tobacco for 15 years.
[c]Patients with Michigan Alcohol Screening Test (MAST) scores of 6 or more were considered to have a "probable diagnosis of alcoholism."
[d]Physical health status and mental health status were measured by the physical and mental components of the Medical Outcomes Study Short Form-36. The established means for these are 50 (SD 10).
BMI, body mass index; MCS, mental component score; PCS, physical component score; SD, standard deviation.

the obesity level of BMI equal to 30). The study group included 67.85% smokers and 7.69% who abused alcohol. The mean global pain score was 41.13 (scale 0–100). Patients' mean self-reported health status was 43.99 for mental health and 40.44 for physical health. These are below the established national mean of 50 for both (SD 10), as measured by the MOS SF-36 physical and mental health components. Over the 1-year study period, the patients' PCC averaged 15.52%. Gender-specific patient sociodemographic health information and PCC received are shown in Table 2. It should be noted that there were no statistically significant differences in patient characteristics among patients seen by male and female residents.

Using pooled t tests, no significant difference in PCC was found between the male and female patients ($p = 0.6258$); however, female physicians provided a significantly greater amount of PCC (16.25% vs. 15.02%) over the study period ($p = 0.0267$).

Regression equations were used to examine the association between patient-centeredness scores and patient gender, controlling for age, education, race, income, obesity, smoking, alcohol abuse, global pain, mental health status, and physical health status. As stated previously, these factors have been demonstrated to influence the patient-physician interaction. In addition, there were significant patient gender differences in education, income, BMI, smoking status, alcohol abuse, and self-reported global pain and mental and physical health status in our study group (Table 2). Patient gender continued to be a nonsignificant factor ($p = 0.4819$) in the provision of PCC over the study period. Likewise, physician gender was analyzed in regression equations as a determinant of year-long PCC, controlling for the same patient variables. Here,

physician gender was associated with the provision of PCC but did not reach statistical significance ($p = 0.0660$).

Next, mean PCC over the year was calculated for the four different patient-physician dyads. As seen in Table 3, the highest percentage of patient-centeredness took place in visits between female patients and female physicians (16.50%), followed by visits where male patients were cared for by female physicians (15.54%). Next were visits between male patients and male physicians (15.22%), and the lowest percentage of PCC was observed in the visits of female patients and male physicians (14.87%). Despite these notable differences, a crude comparison of these means, without adjusting for patient characteristics, did not achieve statistical significance ($p = 0.1072$).

The effects of patient-physician gender dyads were further explored with regressions in which PCC was explained by gender concordance vs. discordance, controlling for age, education, race, income, obesity, smoking, alcohol abuse, global pain, mental health status, and physical health status. In our regression model, there are two variables, male patient-male physician and female patient-female physician. Different

TABLE 3. MEAN PERCENTAGE OF PATIENT-CENTERED CARE OVER 1 YEAR IN FOUR PATIENT-PHYSICIAN GENDER DYADS

Dyad	%
Female patient–female physician (n = 133)	16.50
Male patient–female physician (n = 48)	15.54
Male patient–male physician (n = 143)	15.22
Female patient–male physician (n = 178)	14.87

TABLE 4. STANDARDIZED ESTIMATES FROM REGRESSION EQUATIONS IN WHICH PATIENT-CENTERED CARE OVER 1 YEAR IS EXPLAINED BY PATIENT AGE, EDUCATION, RACE, INCOME, OBESITY, SMOKING, ALCOHOL ABUSE, GLOBAL PAIN, MENTAL HEALTH STATUS, AND PHYSICAL HEALTH STATUS IN CONCORDANT PHYSICIAN-PATIENT DYADS COMPARED WITH DISCORDANT PHYSICIAN-PATIENT DYADS ($n=494$).

Patient-centered care	Associated variables[a]	Standardized estimates	p	R^2
(Family information,	Age	0.0034	0.9418	0.1076
treatment effects,	Education	0.1041	0.0254	
nutrition, exercise,	White	0.0303	0.4936	
health knowledge,	Income	0.1440	0.0022	
patient question,	Obesity	0.0892	0.0425	
chatting, and	Smoking	−0.1235	0.0063	
counseling)	Alcohol abuse	−0.0603	0.1749	
	Global pain	0.0056	0.9237	
	Mental health status	−0.0169	0.7241	
	Physical health status	0.1291	0.0244	
	Male patient-male physician	0.0050	0.9178	
	Female patient-female physician	0.0951	0.0434	

[a]All independent variables are baseline measurements.

genders for patient and physicians serves as the baseline. The results are displayed in Table 4. Female patient-female physician gender concordance vs. discordance was significantly associated with a greater amount of PCC provided ($p=0.0434$); however, there was no significant relationship for the male patient-male physician concordant dyad.

Discussion

Although there are many other variables associated with PCC,[17] this study is one of the first to examine the relationship of patient and physician gender and their concordance on the provision of PCC.

Our hypothesis that female patients would have medical visits characterized by more PCC was not supported. Given the literature reporting that female patients communicate differently with their physicians and have more participatory visits than male patients, possible reasons for this finding are interesting to explore.[20–22] The various communication differences noted for female patients in previous studies may not be the same components included in instruments of measuring PCC.[20–22] Furthermore, these studies employed varied methodologic approaches, including different interactional analysis instruments, use of patient actors or a lack of control for patient variables, a mix of initial and established visits at only one point in time, and lack of information about the kinds of patient-physician gender dyads. The only other study looking specifically at PCC differences between male and female patients found that compared with male patients, females' medical visits had greater PCC. In that study, a different methodology was employed, in which two new standardized patients were seen by each participating physician. In addition, PCC was measured with a different interactional analysis instrument, the Measure of Patient-Centered Communication (MPCC).[22] Unfortunately, as Mead and Bower have pointed out,[64] the MPCC and other observation-based measures of patient-centeredness have varying levels of reliability and concurrent validity and a lack of consistent significant associations with independent variables, such as patient and physician gender or patient health status. This

highlights the challenges to measuring and comparing the findings of studies addressing PCC.

Our hypothesis that female physicians would incorporate more patient-centered practice style behaviors was partially confirmed. Using pooled t tests, we found that female physicians provided significantly more PCC over the study period than male physicians. However, when regressions were used to further examine this association (controlling for patient sociodemographic factor, health risk behaviors, pain, and mental and physical health status), the relationship remained but no longer achieved statistical significance.

It has long been observed that there are important differences in the communication and practice styles of female physicians compared to their male colleagues. Female physicians devote more time to psychosocial issues and partnership building, as well as providing more preventive services.[24–29] Once again, these communication differences suggest a more patient-centered approach by female physicians but cannot be definitive due to differences in tools used to measure practice behaviors. In the study employing the MPCC to quantify PCC, the results regarding its association with physician gender were inconclusive.[23]

Our final hypothesis was supported: gender concordance between female patients and female physicians resulted in the greatest amount of PCC observed. On the other hand, the least amount of PCC was observed in gender-discordant visits of female patients seeing male physicians. Regressions examining the relationship of patient-physician gender concordance and discordance on PCC, again controlling for patient variables, confirmed that female patient-female physician concordance vs. discordance was significantly associated with more PCC being provided. There was no significant association for male patient-male physician concordance. It would appear that the differential communication patterns for female physicians and female patients are additive in their concordant pairing, leading to measurable differences in the amount of PCC provided in this dyad. These findings are compatible with those of other researchers who have also observed similar effects of gender congruence in communication in female-female gender-concordant dyads.[21, 30, 65–67]

Weisman and Teitlebaum[35] theorized that this may be through three mechanisms: patients' different expectations of male and female physicians; gender differences among physicians, especially with respect to gender role attitudes; or the increased status congruence between the physician and patient in concordant dyads.

Both male and female patients may have predetermined expectations of female physicians based on stereotypical female roles or past experiences with female health providers. These may cause patients to expect women physicians to be more empathic and nurturing than male physicians. These expectations may then be reinforced by subtle physician gender differences and responses, which in turn influence the patients' interaction with the female physician, leading to greater comfort in sharing information, asking questions, and therapeutic partnership building.[30]

Female physicians, who have eschewed more conventional female roles in society to enter the medical profession, may be less likely to adopt a traditional physician-centered approach with their patients. They may also be more willing to involve their patients in decision making, creating an atmosphere of more equally balanced communication during the medical encounter. It might also be anticipated that given traditional male-female roles and interaction dynamics, the female patient-male physician dyad may be less comfortable for both individuals than gender-congruent dyads or male patient-female physician combinations.

Discordance is characterized by less ease and greater power inequality during the patient-physician interaction. Male physicians seeing female patients are more prone to display tension and boredom, both verbally and nonverbally, than are female physicians. This may be related to female patients' longer, more complicated presentation of symptoms. Likewise, female and male physicians may have different reactions to female patients, who have been demonstrated to ask more and be more inquisitive and participatory than their male counterparts. Female physicians may respond by being more patient-centered, whereas male physicians might assume a more biomedical focus.[65] It has been shown in a number of studies and venues that a psychosocial oriented consultation (rapport building, asking questions, giving information, counseling) is highest when the physician and patient are both female.[66]

With the increased participation of women in the medical profession, there is growing interest in how physician and patient gender, as well as patient-physician gender dyads, impact the process of care.[67] The number of women in U.S. medical schools has increased steadily over the last three decades. Women went from less than one third of all medical school matriculates in 1982–1983, to 46.9% in 2010–2011.[68] The data for 2007 show that 28.3% of all physicians and 31.3% of the family/general practitioners in active practice in the United States are women.[69] The tendency for women in medicine to provide PCC, especially for female patients, who make two thirds of all outpatient visits, has implications for the profession. Women may be more likely to be receptive to the evolving criteria for measuring competences in this area, and the strengths women demonstrate in PCC may lead to improvement in process and outcomes of care.[70]

There is a clear mandate for improving healthcare delivery and providing quality PCC. Our findings suggest that female concordant patient-physician gender dyads incorporate the greatest amount of PCC, and the patients of male physicians receive relatively less PCC. If there are inherent inequalities in medical encounters based on physician gender and the combination of physician and patient gender in consultative dyads, training may be required to address these practice style differences and to improve patient-centeredness during the medical encounter. Medical school and residency curricula should include the principles of PCC. Practicing physicians of both genders can also be effectively trained to use more patient-centered skills and maintain these skills in their practices.[71,72]

There are a number of limitations to this study that should be noted. Patients were randomized to primary care clinic (family practice or internal medicine), not to specific providers according to gender. As a result, the number of each type of patient-physician gender dyad is not equal (as seen in Table 3). Our research was conducted at a university medical center with primary care resident physicians, who may have different practice styles than community physicians. In addition, patients participating in the study had no preference for specific physician or specialty. These patients may represent a different population and have different sociodemographic characteristics, health risk behaviors, and health status than patients cared for in the community. Controlling for these variables in our analysis, we hope, helped to mitigate those differences.

Future studies of the influence of gender dyads and the process of care will need to focus greater attention on the assessment of patient health outcomes and other indices of quality of care, using consistent communication analyses tools in a wider range of clinical settings.

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Disclosure Statement

The authors have no conflicts of interest to report.

References

1. Institute of Medicine. Crossing the quality chasm: A new health system for the 21st century. Washington, DC: National Academies Press, 2001.
2. Franks P, Jerant AF, Fiscella K, Shields CG, Tancredi DJ, Epstein RM. Studying physician effects on patient outcomes: Physician interactional style and performance on quality of care indicators. Soc Sci Med 2006;62:422–432.
3. Mead N, Bower P. Patient-centered consultations and outcomes in primary care: A review of the literature. Patient Educ Couns 2002;48:51–61.
4. Stewart M, Brown JB, Donner A, et al. The impact of patient-centered care on outcomes. J Fam Pract 2000;49:796–804.
5. Radwin LE, Cabral HJ, Wilkes G. Relationships between patient-centered cancer nursing interventions and desired health outcomes in the context of the health care system. Res Nurs Health 2009;32:4–17.
6. Henbest RJ, Stewart M. Patient-centredness in the consultation 2: Does it really make a difference? Fam Pract 1990;7:28–33.
7. Greenfield S, Kaplan SH, Ware JE, Yano EM, Frank HJ. Patients' participation in medical care: Effects on blood sugar

control and quality of life in diabetes. J Gen Intern Med 1988;3:448–457.

8. Graugaard PK, Finset A. Trait anxiety and reactions to patient-centered and doctor-centered styles of communication: An experimental study. Psychosom Med 2000;62:33–39.

9. Kinnersley P, Stott N, Peter TJ, Harvey I. The patient-centredness of consultations and outcome in primary care. Br J Gen Pract 1999;49:711–716.

10. Winefield H, Murrell T, Clifford J, Farmer E. The search for reliable and valid measures of patient-centredness. Psychol Health 1996;11:811–824.

11. Roter DL, Hall JA, Katz NR. Relations between physicians' behaviors and analogue patients' satisfaction, recall, and impressions. Med Care 1987;25:437–451.

12. Flocke SA, Miller WL, Crabtree BF. Relationships between physician practice style, patient satisfaction, and attributes of primary care. J Fam Pract 2002;51:835–840.

13. Krupat E, Rosenkranz SL, Yeager CM, Barnard K, Putnam SM, Inui TS. The practice orientation of physicians and patients: The effect of doctor-patient congruence on satisfaction. Patient Educ Couns 2000;39:49–59.

14. Ong LM, Visser MR, Lammes FB, de Haes JC. Doctor-patient communication and cancer patient's quality of life and satisfaction. Patient Educ Couns 2000;41:145–156.

15. Mead N, Bower P, Hann M. The impact of general practitioners' patient centredness on patients' post-consultation satisfaction and enablement. Soc Sci Med 2002;55:283–299.

16. Wolf DM, Lehman L, Quinlin R, Zullo T, Hoffman L. Effect of patient-centered care on patient satisfaction and quality of care. J Nurs Care Qual 2008;23:316–321.

17. Bertakis KD, Azari R. Determinants and outcomes of patient-centered care. Patient Educ Couns 2011;85:46–52.

18. Epstein RM, Franks P, Shields CG, Meldrum SC, et al. Patient-centered communication and diagnosis testing. Ann Fam Med 2005;3:415–421.

19. Bertakis KD, Azari R. Patient-centered care is associated with decreased health care utilization. J Am Board Fam Med 2011;24:229–239.

20. Hall JA, Roter DL. Patient gender and communication with physicians: Results of a community-based study. Womens Health 1995;1:77–95.

21. Kaplan SH, Gandek B, Greenfield S, Rogers W, Ware JE. Patient and visit characteristics related to physicians' participatory decision-making style. Results from the Medical Outcomes Study. Med Care 1995;33:1176–1187.

22. Bertakis KD, Azari R. Patient gender and physician practice style. J Womens Health 2007;16:859–868.

23. Bertakis KD, Frank P, Epstein RM. Patient-centered communication in primary care: Physician and patient gender and gender concordance. J Womens Health 2009;18:539–545.

24. Bertakis KD, Helms LJ, Callahan EJ, Azari R, Robbins JA. The influence of gender on physician practice style. Med Care 1995;33:407–416.

25. Bertakis KD, Franks P, Azari R. Effects of physician gender on patient satisfaction. J Am Med Womens Assoc 2003;58:69–75.

26. Roter DL, Hall JA. Physician gender and patient-centered communication: A critical review of the empirical research. Annu Rev Public Health 2004;25:497–519.

27. Roter DL, Hall JA, Aoki Y. Physician gender effects in medical communication: A meta-analytic review. JAMA 2002;288:756–764.

28. Zandbelt LC, Smets EM, Oort FJ, Godfried MH, de Haes HC. Determinants of physicians' patient-centered behavior in the medical specialist encounter. Soc Sci Med 2006;63:899–910.

29. Street RL Jr, Gordon HS, Ward MM, Krupat E, Kravitz RL. Patient participation in medical consultations: Why some patients are more involved than others. Med Care 2005;43:960–969.

30. Law SA, Britten N. Factors that influence the patient centredness of a consultation. Br J Gen Pract 1995;45:520–524.

31. Garcia JA, Paterniti DA, Romano PS, Kravitz RL. Patient preferences for physician characteristics in university-based primary care clinics. Ethn Dis 2003;13:259–267.

32. Bonds DE, Foley KL, Dugan E, Hall MA, Extrom P. An exploration of patients' trust in physicians in training. J. Health Care Poor Underserved 2004;15:294–306.

33. Hall JA, Irish JT, Roter DL, Ehrlich CM, Miller LH. Gender in medical encounters: An analysis of physician and patient communication in primary care setting. Health Psychol 1994;13:384–392.

34. Franks P, Bertakis KD. Physician gender, patient gender, and primary care. J Womens Health 2003;12:73–80.

35. Weisman CS, Teitelbaum MA. Physician gender and the physician-patient relationship: Recent evidence and relevant questions. Soc Sci Med 1985;20:1119–1127.

36. Callahan EJ, Bertakis KD, Azari R, Robbins JA, Helms LJ, Change DW. The influence of patient age on primary care resident physician-patient interaction. J Am Geriatr Soc 2000;48:30–35.

37. Fiscella K, Goodwin MA, Stange KC. Does patient education level affect office visits to family physicians? J Natl Med Assoc 2002;94:157–165.

38. Oliver MN, Goodwin MA, Gotler RS, Gregory PM, Stange KC. Time use in clinical encounters: Are African-American patients treated differently? J Natl Med Assoc 2001;93:380–385.

39. Bertakis KD, Azari R. The impact of obesity on primary care visits. Obes Res 2005;13:1615–1623.

40. Bertakis KD, Azari R. Determinants of physician discussion regarding tobacco and alcohol abuse. J Health Commun 2007;12:513–525.

41. Bertakis KD, Azari R. Patient pain: Its influence on primary care physician-patient interaction. Fam Med 2003;35:119–123.

42. Callahan EJ, Bertakis KD, Azari R, Robbins JA, Helms LJ, Miller J. The influence of depression on physician-patient interaction in primary care. Fam Med 1996;28:346–351.

43. Callahan EJ, Jaén CR, Crabtree BF, Zyzanski SJ, Goodwin MA. Stange KC. The impact of recent emotional distress and diagnosis of depression or anxiety on the physician-patient encounter in family practice. J Fam Pract 1998;46:410–418.

44. Bertakis KD, Callahan EJ, Helms LJ, Azari R, Robbins JA. The effect of patient health status on physician practice style. Fam Med 1993;25:530–535.

45. National Heart, Lung and Blood Institute. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report. Bethesda, MD: National Institute of Health, 1998.

46. U.S. Department of Health and Human Services. The health consequences of smoking: A report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004.

47. Cherpitel CJ. Brief screening instruments for alcoholism. Alcohol Res Health 1997;21:348–351.

48. Littman GS, Walker BR, Schneider BE. Reassessment of verbal and visual analog ratings in analgesic studies. Clin Pharmacol Ther 1985;38:16–23.

49. Revill SI, Robinson J, Rosen M. Hogg MI. The reliability of a linear analogue for evaluating pain. Anaesthesia 1976;31: 1191–1198.

50. Stewart AL, Hays RD, Ware JE Jr. The MOS Short-form General Health Survey. Reliability and validity in a patient population. Med Care 1988;26:724–735.

51. Stewart AL, Greenfield S, Hay RD. Functional status and well-being of patients with chronic disease conditions. Results from the Medical Outcomes Study. JAMA 1989;262: 907–913.

52. McHorney CA, Ware JE, Raczek, AE. The MOS 36-item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests validity in measuring physical and mental health constructs. Med Care 1993;31:247–263.

53. Ware JE, Kosinski M, Keller SD. SF-36 Physical and Mental Health Summary Scales: A user's manual. Boston: The Health Institute, 1994.

54. Callahan EJ, Bertakis KD. Development and validation of the Davis Observation Code (DOC). Fam Med 1991;23:19–24.

55. Stange KC, Zyzanski SJ, Jaén CR, et al. Illuminating the "black box": A description of 4,454 patient visits to 138 family physicians. J Fam Pract 1998;46:377–389.

56. Bertakis KD, Azari R, Callahan EJ, Robbins JA, Helms LJ. Comparison of primary care resident physicians' practice styles during initial and return patient visits. J Gen Intern Med 1999;14:495–498.

57. Frank SH, Stange KC, Langa D, Workings M. Direct observation of community-based ambulatory encounters involving medical students. JAMA 1997;278:712–716.

58. Kikano GE, Snyder CW, Callahan EJ, Goodwin MA, Stange KC. A comparison of ambulatory services for patients with managed care and fee-for-service insurance. Am J Manag Care 2002;8:181–186.

59. Blankfield RP, Goodwin M, Jaen CR, Stange KC. Addressing the unique challenges of inner-city practice: A direct observation study of inner-city, rural, and suburban family practices. J Urban Health 2002;79:173–185.

60. Tabenkin H, Goodwin MA, Zyzanski SJ, Stange KC, Medalie JH. Gender differences in time spent during direct observation of doctor-patient encounters. J Womens Health 2004;13:341–349.

61. Yawn B, Zyzanski SJ, Goodwin MA, Gotler RS, Stange KC. The anatomy of asthma care visits in community family practice. J Asthma 2002;39:719–728.

62. Mead N, Bower P. Patient-centredness: A conceptual framework and review of the empirical literature. Soc Sci Med 2000;51:1087–1110.

63. Barlow W, Lai M, Azen SP. A comparison of methods for calculating a stratified kappa. Stat Med 1991;10:1465–1472.

64. Mead N, Bower P. Measuring patient-centredness: A comparison of three observation-based instruments. Patient Educ Couns 2000;39:71–80.

65. Elderkin-Thompson V, Waitzkin H. Differences in clinical communication by gender. J Gen Intern Med 1999;14: 112–121.

66. Brink-Muinen A, van Dulmen S, Messerli-Rohrbach V, Bensing J. Do gender-dyads have different communication patterns? A comparative study in western-European general practices. Patient Educ Couns 2002;48:199–200.

67. Sandhu H, Adams A, Singleton L, Clark-Carter D, Kidd J. The impact of gender dyads on doctor-patient communication: A systematic review. Patient Educ Couns 2009;76: 348–355.

68. Chart 3: U.S. medical student matriculates by gender. Available at www.aamc.org/download/153708/data/charts1982to2011.pdf Accessed June 21, 2011.

69. Table 3. Number and percentage of active physicians by sex and specialty, 2007. Available at www.aamc.org/download/47352/data/specialtydata.pdf Accessed June 21, 2011.

70. Levinson W, Lurie N. When most doctors are women: What lies ahead? Ann Intern Med 2004;141:471–474.

71. Roter DL, Hall JA, Kern DE, Barker LR, Cole KA, Roca RP. Improving physicians' interviewing skills and reducing patients' emotional distress. A randomized clinical trial. Arch Intern Med 1995;155:1877–1884.

72. Helitzer DL, Lanoue M, Wilson B, de Hernandez BU, Warner T, Roter D. A randomized controlled trial of communication training with primary care providers to improve patient-centeredness and health risk communization. Patient Educ Couns 2011;82:21–29.

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