Patient perception of enough time spent with provider is a mechanism for improving women Veterans' experiences with VA outpatient healthcare

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Abstract

We postulated that associations between two specific provider characteristics, class (nurse practitioner relative to physician) and primary care providers who are proficient and interested in women's health (designated women's provider relative to non-designated), and overall satisfaction with provider, were mediated through women Veterans' perception of enough time spent with the provider. A national patient-experience survey was administered to 7,620 women Veterans. Multivariable models of overall patient satisfaction with provider were compared with and without the proposed mediator. A structural equation model (SEM) of the mediation of the two provider characteristics was also evaluated. Without the mediator, associations of provider class and designation with overall patient satisfaction were significant. With the proposed mediator these associations became non-significant. A SEM showed that the majority (>80%) of the positive associations between provider class and designation and the outcome were exerted through patient perception of enough time spent with provider. Higher ratings of overall satisfaction with provider exhibited by nurse practitioners and designated women's health providers were exerted through patient perception of enough time spent with provider. Future research should examine what elements of provider training can be developed to improve provider-patient communication and patient satisfaction with their health care.

Keywords

Introduction

The number of women Veterans using the Veteran Administration (VA) healthcare system has doubled in the past decade, (Frayne, Phibbs, & Friedman, 2012). In 2010, the VA established a policy requiring the provision of comprehensive women's healthcare (including care for acute and chronic disease, preventive care, and gender specific care) by designated women's health providers (DWHPs) at all sites of care (Veterans Health Administration. Health Care Services for Women Veterans (VHA Handbook 1330.01, 2010). Per VA policy, DWHPs are primary care providers who are proficient and interested in women's health, and who are preferentially assigned women Veterans. DWHPs may practice in women-specific clinics (women's clinics) or in mixed-gender primary care clinics. Using a national VA patient-experience survey, i.e., the VA Survey of Healthcare Experience of Patients (SHEP), researchers Bastian et al., 2014) evaluated the association between provider designation (DWHP relative to non-DWHP) and overall satisfaction with provider for outpatient care provided to women Veterans at the VA. Two important findings were that

women Veterans' overall experiences with outpatient healthcare were better for those receiving care from DWHPs compared to non-DWHPs and for those receiving care from nurse practitioners compared to physicians.

Previous studies have examined differences in patient experiences with care by provider type. In a systematic review of studies between 1966 and 2001, Horrocks, Anderson, and Salisbury (2002) concluded that care provided by nurse practitioners was associated with increased satisfaction relative to that provided by physicians. Another review of studies (Newhouse et al., 2011) between 1990 and 2008 noted that patient satisfaction with primary care was equivalent between services provided by nurse practitioners and those provided by physicians. Specific to VA care, Budzi, Lurie, Singh, and Hooker (2010) found that Veterans were more satisfied with care provided by nurse practitioners relative to that provided by physicians. In the original article Budzi ascribed the superior ratings for nurse practitioners to their focus on health promotion, health education, attentiveness, and counseling. However, in a follow-up letter the remaining authors (Lurie, Singh, & Hooker, 2010) repudiate these ascriptions, citing conjecture on the part of the lead author. Another non-VA study found older patients (>65 years) were more satisfied with nurse practitioners (Cipher, Hooker, & Sekscenski, 2006). Little is known about the quality of the healthcare that nurse practitioners and physicians provide for women Veterans. Research conducted on gender differences in patient satisfaction among non-Veteran populations is difficult to apply to Veterans as this group has unique life experiences and healthcare needs.

Although Bastian et al. 2014) have shown that women Veterans are more satisfied with care provided by nurse practitioners (relative to physicians) and DWHPs (relative to non-DWHPs), the potential mediation of this increased satisfaction has not been explored. Chen-Tan et al. (2001) found that in an ambulatory internal medicine practice, perceived visit duration and the meeting or exceeding of patient expectations regarding time spent with the physician were significant determinants of patient satisfaction. Patient perceptions of enough time is subjective and can be influenced by provider behavior and communication style such as use of eye contact, voice tone, pace of speech, and choice of topics to be discussed during the visit. For example, how fast a provider speaks, can either strengthen or diminish the patient's sense that their provider is spending enough time addressing their needs (Weiss, 2003). Also, differences in practice style between female and male providers may affect both perceived visit time and patient satisfaction (Bertakis, 2009). For example, female physicians have been shown to provide more preventative services and counseling than male physicians, who tend to spend more time on technical behaviors like physical exam and medical history taking (Tabenkin, Goodwin, Zyzanksi, Stange, & Medalie, 2004). To date, gender differences in nurse practitioner practice styles have not been studied.

Conceptual Model

The conceptual framework for this study was adapted from the Donabedian Model (Coyle & Battles, 1999; Donabedian, 1988). This model describes the influence of antecedents (patient characteristics), the structure of care (organizational factors and provider characteristics) and process of care (the acts of healthcare delivery, such as length of time patient worked with provider, qualification as a DWHP, and of time spent with provider) on

quality of care (patients' ratings of their overall experience with the provider). Based on these constructs, we examined the associations between two specific provider characteristics (class and designation) and overall satisfaction with provider, while controlling for antecedents, structure, and process. We also evaluated potential mediation of the significantly positive associations between these two provider characteristics and overall satisfaction with provider exerted through patient perception of enough time spent with provider.

Methods

This study was approved by the Human Studies Subcommittee at the West Haven Connecticut VA Medical Center. The methods associated with SHEP administration, as well as construction of the dataset, have been described previously (Bastian et al., 2014). SHEP is a national cross-sectional questionnaire that was administered to 418,508 men and women Veterans between March 2012 and February 2013. SHEP uses the Consumer Assessment of Healthcare Providers and Systems and patient-centered medical home items. Women Veterans seen by physician assistants, RNs and other classes of non-primary care providers were excluded from the analytic dataset. The data are therefore restricted to those women Veteran respondents seen by either nurse practitioners or physicians (N=7,620). As recently reported (Bastian et al., 2014), women Veterans cared for by DWHPs were likely to complete the SHEP survey at the same rate as women seen by non-DWHP patients (31.9% *v.* 32.9%, respectively; p = 0.074). Provider characteristics were obtained from the Veterans Health Administration Corporate Data Warehouse as described in Bastian et al. (2014). Provider variables used in the models included class (nurse practitioner relative to physician), total patient panel size, i.e., the number of patients assigned to that provider/100), and an indicator of whether the provider regularly works in a VA women's clinic.

Patient characteristics obtained from SHEP survey included age (in years), self-reported race (white or non-white), patient education (high school or >high school), and period of time going to this provider (< 6 months, 6 months to < 1 year, 1 to < 3 years, 3 to < 5 years, or 5 years). Our main outcome measure was overall satisfaction with provider, which ranged from 0 (worst) to 10 (best). The proposed mediator, patient perception of enough time spent with provider, corresponds to the following SHEP-survey question: "In the last 12 months, how often did this provider spend enough time with you?" Response options included "never", "sometimes", "usually", and "always," coded with ordinal values from 0 (never) to 3 (always).

Statistical Analysis

Characteristics of providers and survey respondents were calculated as appropriate. Differences between provider classes were evaluated with t-tests for normally distributed distributions, Wilcoxon Rank-sums tests for continuous non-normal distributions, and chi-square statistics for counts. For the provider class comparisons a two-tailed p-value 0.05 defined significance.

We used generalized linear models (Fitzmaurice, Laird, & Ware, 2004) to calculate the associations of provider class and designation with the outcome (overall satisfaction with provider), both with and without the hypothesized mediator, i.e., patient perception of enough time spent with provider. These models were adjusted for the following patient (age, race, education, and period of time going to this provider); and provider (total patient panel size and an indicator of whether the provider regularly works in a VA women's clinic) covariates. We were unable to include provider gender in our models due to its high correlation with provider class and designation. Overall satisfaction with provider, measured on a 0–10 scale, was assumed to follow a Poisson distribution and additionally adjusted for clustering of patients within providers with generalized estimating equations.

To investigate whether patient perception of enough time spent with provider mediated the significantly positive associations of provider class and designation and the outcome-satisfaction with provider, we used a structural equation model (SEM) (Byrne, 2012). The final structural equation model adjusted for the following patient (age in years, race, education, and period of time with this provider) and provider (total panel size (number of patients/100) and an indicator of whether the provider regularly works in a VA women's clinic) covariates. The structural equation model additionally adjusted for clustering within provider and used restricted maximum likelihood estimation to obtain fit indices.

The following measures were used to assess the fit of the structural equation model: Bentler's comparative fit index (CFI) (Bollen, 1989), root mean squared error approximation (RMSEA) (Steiger & Lind, 1980), and Standardized Root Mean Square Residual (SRMR). In general, values for CFI > 0.96, SRMR < 0.09, and RMSEA < 0.06 are considered excellent model fit (Cole & Maxwell, 2003; Hu & Bentler, 1999). For tests of mediation, overall model fit is often of less relevance than the statistical significance of the direct and indirect (mediating) effects. Significance of these associations was evaluated with two-sided, t-statistics with p-value 0.05 denoting significance. We also present a summary table (Pearl, 2000) of the total, direct, and indirect effects for provider class and designation via the mediator, i.e., patient perception of enough time spent with provider.

All models used complete case analysis and generalized linear models were performed with SAS 9.2 (SAS® Institute, Cary, NC, USA) and structural equation models with Mplus (Version 7.1 Los Angeles, CA, USA: Muthén & Muthén). Asymmetric confidence intervals for the indirect effects were calculated with R package, *Rmediation* (Tofighi & MacKinnon, 2011), using the Monte Carlo method with a sample size of 1,000.

Results

In its comparison by provider class, Table 1 indicates that whereas 77% of the 2,945 unique providers were physicians, nurse practitioners were characterized by a higher proportion of DWHPs (57% *v.* 34.8%, respectively; p <.0001). Other characteristics also showed significant differences between provider classes (i.e., nurse practitioners and physicians, p-values < 0.01): nurse practitioners were slightly older (54.2 *v.* 52.3 years), more likely to be female (92.8 *v.* 52.5%), had slightly fewer work hours (0.66 v 0.71 Full-time equivalent proportion-FTE), and had fewer patients in their panels (1,133 *v.* 1,348). Looking in greater

detail at the composition of the patient panels, panels of nurse practitioners had a significantly greater percentage of female patients (6.9 *v.* 5.5%). In the bottom half of Table 1, patient characteristics exhibited smaller provider class differences. The 73% of unique women Veterans assigned to physicians were not significantly different from their counterparts seen by nurse practitioners with regard to age (years), age category, race, or education.

The results from the generalized linear models demonstrate that in a model without patient perception of enough time spent with provider, that both provider class (p = 0.002) and designation (p < 0 .001) show consistent associations with overall satisfaction with provider. Relative to other patients, those seen by nurse practitioners or DWHPs exhibit overall satisfaction that is, on average, about 3% higher or 0.3 on a 10 point scale. We note that because of the likely correlation among patients assigned to the same provider, we used the Sandwich Estimator to adjust the standard error of the estimated associations. This adjustment made no substantive difference relative to the unadjusted variability and p-values, suggesting that whatever correlation existed within providers played no meaningful role in model estimation.

The addition of the hypothesized mediator to the same multivariable model renders insignificant the formerly significant positive associations between provider class and designation and the outcome. Each incremental rise in the ordinal scale of the hypothesized mediator is associated with an increase of about 10% in the overall satisfaction score, i.e., about one point in the 10-point scale.

The two primary explanatory variables provider class and designation exhibited small but significant correlations of 0.07 and 0.08, respectively (N=7,252; p < 0.001, both) with patient perception of enough time spent with provider. Although provider class and designation were each characterized by higher proportions of "Always" spending adequate time with patients (provider class nurse practitioners *v.* physicians: 76.7% *v.* 70.7%, p-value < 0.001; provider designation DWHP *v.* Non-DWHP: 74.0% v. 70.0%; p < 0.001), their respective two-factor interaction terms were not significantly associated with the hypothesized mediator. For this reason they were not included in the final SEM model.

Figure 1 demonstrates excellent fit (CFI > 0.95 and SRMR < 0.05; RMSEA < 0.09) of the final SEM model. Patient perception of enough time spent with provider was associated with a significant direct path to overall satisfaction with provider (estimate=2.15, p < 0.001) and with significant indirect paths from both provider class (estimate=0.10, p < 0.001) and provider designation (estimate=0.09, p < 0.001) to overall satisfaction with provider. As in the generalized linear models, overall satisfaction experiences about a 1 point increase for each incremental rise in the ordinal scale of the hypothesized mediator. For their part the indirect paths for both provider characteristics show statistically significant yet very small increases (~0.1 on the 10-point rating scale) for nurse practitioners and DWHPs (compared to physicians and non-DWHPs, respectively). In the context of the mediator, direct paths between both provider characteristics and overall satisfaction with provider were non-significant.

Figure 1 shows that although neither provider class nor provider designation exhibit significant direct associations with overall satisfaction, their indirect and total associations with that outcome are significant (both p < .001). The structural equation model coefficients reveal that $100 \times (0.21/0.24) = 88\%$ and $100 \times (0.2/0.25) = 80\%$ of the respective associations between provider class and provider designation can be attributed to the mediator, i.e., patient perception of enough time spent by the provider.

Discussion

While restricting our analytical cohort to patients seen only by nurse practitioners and physicians, we have replicated the previous reported findings that women Veteran patients seen by nurse practitioners and DWHPs exhibited a 3% improvement of satisfaction scores associated with DWHP compared to non-DWHP and nurse practitioners compared to physicians. The higher ratings of overall satisfaction with provider exhibited by nurse practitioners and designated women's providers were exerted through patient perception of enough time spent with provider.

There may be many intangible components inherent to understanding patient's perception of time spent with provider. One possible explanation is that either the training or cumulative experience of the nurse practitioners and DWHPs has shown them how to manage their face-to-face time with patients in a way that is more satisfying for women Veterans. Conversely, factors (e.g., personality type) contributing to improved overall provider ratings may have been present prior to training and may have led to a selection effect for provider class and designation. If the characteristics of provider-patient communication that contribute to patient perception of enough time spent with provider can be clearly identified in women Veterans and other populations, they could potentially be used to inform inter-professional curriculums, practical training, and policies aimed at raising patient satisfaction ratings.

We recognize that patient perception of enough time spent with provider is not the same as an objective measure of time spent with the provider. There are several problems with reconciling actual time spent with the patient, with the amount of time scheduled for the visit. The actual amount of time the provider spends with the patient, which can be called "room time," is affected by variables such as interruptions during the visit (phone calls and speaking to other staff); by the provider's workload and number/timing of visits in the schedule (providers with a heavy workload and a full schedule with no openings may rush through visits and spend less time with the patient than providers with less work and a lighter schedule); and by patient variables such as arrival time for the appointment (patients who present 20 minutes late for their 30-minute appointment may only get to spend the remaining 10 minutes with the provider). Although the amount of "room time" for visits varies dramatically and can be difficult to track, Dugdale, Epstein, and Pantilat (1999) concluded that actual time may be less important than the patient's perception of the visit: "... studies demonstrate that, for visits between 16 and 30 minutes in length, it is not the actual time spent with the physician that affects outcome, but rather what happens during that time."

As the population of women Veterans seeking health care at the VA continues to grow, two related changes are occurring. First, nurse practitioners increasingly are being employed and second, more providers of both classes (nurse practitioners and physicians) are becoming DWHPs. At five primary-care sites, the VA is already testing inter-professional education models called Centers of Excellence (COEs) that include shared educational and patient care components for preceptors and trainees from provider groups such as physicians, nurse practitioners, pharmacists, and health psychologists. There is some preliminary evidence that the COE model seems to increase same-day clinic access for patients as well as productivity (total amount of clinical work) (Long, Dann, Wolff, & Brienza, 2014). Additionally, qualitative studies exploring experiences of COE trainees indicate that the inter-professional educational model facilitates mutual respect and role recognition between nurse practitioners and physician residents (Jaspen, 2013; Meyer, Zapatka, & Brienza, 2014). Since the VA intends to use these data and experiences obtained from the current COEs as a foundation for all its healthcare training, the VA system may become a key environment for identifying and analyzing the differences between provider groups and adapting this information to improve quality of care.

The importance of patient satisfaction is not limited to the VA system: with changes in private-sector healthcare related to the Affordable Care Act and accountable care organizations, satisfaction is increasingly being used to determine reimbursement rates (Jaspen, 2013). The expanding role of patient satisfaction was recognized by the Institute of Medicine (IOM) when it stated that transparency in healthcare, which includes making data on patient satisfaction available to the public, was an essential component of 21st-century healthcare systems and informed decision making (Institute of Medicine, 2001). Although the relationship between patient satisfaction and more traditional quality-of-care outcomes remains controversial (Brookes & Fenton, 2014), understanding the reasons that NPs and DWHPs achieved slightly better satisfaction among women Veterans is important because the VA is the largest integrated healthcare system in the country.

There are several limitations to describe. First, causal models typically assume that there is no unmeasured confounding of the treatment-outcome, mediator-outcome, or treatment-mediator relationships (Valeri & VanderWeele, 2013). Since this was not a randomized trial, it is possible that no assumption is precluded. However, there exists the implicit proper temporal ordering (Cole & Maxwell, 2003) for a causal interpretation, in that provider designation and provider class are well antecedent to patient perception of enough time spent with provider which precedes the outcome, overall provider rating. Since the two latter variables were measured simultaneously, there is no guarantee that they meet the assumption of temporal ordering. Therefore, we make no causal claims but merely delineate these relationships for future investigation.

We also caution that satisfaction scores, while important measures of patient care, are not objective measures of quality or costs. It has been separately reported that patients seen by DWHPs report higher rates of certain quality measures of women's healthcare, i.e., indicators regarding mammography and cervical cancer screening (Bean-Mayberry et al., 2015). Like this study, the latter study focused on women only. There is, however, little

difference between the provider designations (DWHP *v.* Non-DWHP) with regard to other general healthcare measures for women or among men.

Conclusion

We conducted analyses demonstrating that two specific provider characteristics, provider class and provider designation, exerted their small positive associations with overall provider rating, primarily through a mediator, i.e., patient perception of enough time spent with their provider. Future research should examine what elements of provider training can be developed to improve provider-patient communication and patient satisfaction with their health care.
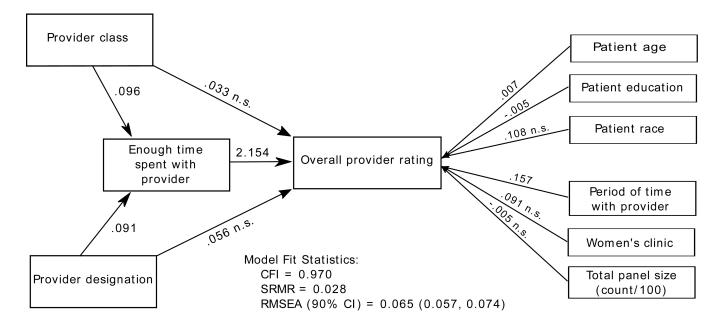
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Figure 1. Structural Equation Model: Mediation of Provider Class and Provider Designation on Overall Provider Rating by Patient Perception of Enough Time Spent with Provider

Variable	Effect	Estimate (99.9% CI)	P-values[a]
Provider Class	Indirect[b]	0.21 (0.05, 0.36)	<.001
	Direct	0.03 (-0.10, 0.17)	0.417
	Total	0.24 (0.03, 0.45)	<.001
Provider Designation	Indirect[b]	0.20 (0.05, 0.34)	<.001
	Direct	0.06 (-0.09, 0.20)	0.197
	Total	0.25 (0.05, 0.45)	<.001

All figure coefficients significant at p-value < 0.001, except where noted as non-significant (n.s.).

Abbreviations: CI, confidence interval; CFI, Bentler's Comparative Fit Index; SRMR, Standardized Root Mean Square Residual; RMSEA, Root Mean Square Error of Approximation

[a] p-value of testing null hypothesis of no effect.

[b] Association of variable with outcome operates through mediator, patient perception of enough time spent with provider. Asymmetric 99.9% confidence intervals and probabilities computed with Monte Carlo method (sample size = 1,000). Direct and total effect confidence intervals and probabilities computed using normal distributions.

Table 1

Survey of Healthcare Experiences (SHEP) Provider and Patient (Women Veteran) Characteristics.

Provider [a] Characteristics (N = 2,945 Unique Providers)			
	Nurse Practitioners	**Physicians**	**p**
Number of Providers, n (%)	688 (23.4)	2,257 (76.6)	
Classified as DWHP, n (%)	394 (57.3)	785 (34.8)	<0.0001[b]
Age, mean (SD)	54.2 (8.3)	52.3 (9.4)	<0.0001[c]
Gender, n (%)			<0.0001[b]
Female	530 (92.8)	959 (52.5)	
Male	41 (7.2)	869 (47.5)	
Full-Time Proportion, mean (SD)	0.66 (0.36)	0.71 (0.35)	0.0091[c]
Total Patient Panel, mean (SD)	1,133.0 (674.8)	1,347.6 (602.6)	<0.0001[c]
Male	983.8 (682.3)	1,220.9 (616.3)	<0.0001[b]
Female	142.0 (194.0)	116.3 (153.6)	0.0016[b]
% Female, median (IQR)	6.9 (4.4–12.1)	5.5 (3.5–9.1)	<0.0001[d]
Scheduled in Women's Clinics only, n (%)	192 (28.1)	465 (20.6)	<0.0001[b]
Scheduled in Non-women's Clinics only, n (%)	402 (58.9)	1,577 (69.9)	<0.0001[b]
Scheduled in both Women's and Non-women's Clinics, n (%)	89 (13.0)	213 (9.4)	0.0069[b]
Patient Characteristics (N =7,620)			
Patient Seen by:	**Nurse Practitioners**	**Physicians**	**p**
n (%)	2,067 (27.1)	5,553 (72.9)	
Age in years, mean (SD)	56.2 (14.3)	56.3 (13.9)	0.6914[c]
Race, n (%)			0.1326[b]
White	1,494 (74.7)	3,909 (73.0)	
Non-White	505 (25.3)	1,446 (27.0)	
Education, n (%)			0.0786[b]
8th grade or less	2 (0.1)	3 (0.1)	
Some HS	15 (0.7)	21 (0.4)	
HS or GED	335 (16.4)	899 (16.3)	
Some college	1,069 (52.2)	2,745 (49.8)	
College graduate	305 (14.9)	872 (15.8)	
More than college degree	321 (15.7)	967 (17.6)	
In the last 12 months, how often did this provider spend enough time with you? n (%)			<.0001[b]
Never	45 (2.3)	258 (4.9)	
Sometimes	100 (5.1)	411 (7.8)	

	Usually	312 (15.9)	879 (16.6)	
	Always	1,508 (76.7)	3,739 (70.7)	

Abbreviations: IQR, Interquartile range

[a] Providers who are in the recognized provider classes, had active privileges during the survey period (2012–2013), and who have seen at least one woman patient.

[b] χ^2 test

[c] Student t-test

[d] Wilcoxon Rank-Sum Test

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