

Addressing Medicaid Expansion from the Perspective of Patient Experience in Hospitals

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Abstract

Background More Medicaid holders are entering the healthcare system consequential to Medicaid expansion. Their experience has financial consequences for hospitals and crucial implications for the provision of patient-centered care. This study examined how the hospital characteristics, especially the rates of Medicaid coverage and racial/ethnic minorities, impact the quality of inpatient care.

Methods Using data for years 2009–2011 for 870 observations of California hospitals, and data collected from patients via the Hospital Consumer Assessment of Healthcare Providers and Systems survey coupled with data from the Healthcare Cost and Utilization Project and American Hospital Association Annual Survey, we used a generalized estimating equation approach to evaluate patients' experience with hospital care. Our multivariate model includes a comprehensive set of characteristics capturing market, structural, process, and patient demographics associated with the patient's hospital stay.

Results The findings indicate that high concentrations of Medicaid patients in the hospital negatively impact the perceived patient experience. In addition, all things being equal, hospitals with higher concentrations of Hispanic, Black, and Asian patients received lower patient satisfaction results on 28 of the 30 regression coefficients capturing patient satisfaction, with 22 of the 30 negative coefficients statistically significant.

Conclusions Hospitals serving higher concentrations of Medicaid patients and more racial/ethnic diverse patients experienced a less satisfactory patient experience than patients utilizing other payers or patients who were White. Our research magnifies the challenge for addressing the disparities that exist in healthcare. Further research is called for clarifying the underlying reasons for these disparities and the optimal strategies for addressing these problems.

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Key Points for Decision Makers

Hospitals with higher concentrations of Medicaid patients systematically reported worse patient experience.

Higher concentrations of racial and ethnic minorities resulted in significantly lower patient experience scores on all ten measures of patient satisfaction.

As the US hospital payment system continues to migrate to a value-based performance that reimburses hospitals based on their patient experience scores, hospitals serving higher levels of Medicaid and racial/ethnic minorities will face growing challenges to their financial viability.

1 Introduction

Patient experience is a crucial part of medical care outcome. As a key component of care quality [1], patient experience was included in the Patient Protection and Affordable Care Act (PPACA) of 2010 value-based purchasing (VBP) legislation. In this new system, 30 % of the Medicaid incentives paid to hospitals is dependent on patient experience scores. Monitoring and responding to patient experience should be a priority for hospitals because of the impact patient experience can have on patient health and hospital finances [2, 3]. As such, it is imperative that hospitals learn about patients' perceived needs and values to develop services that are appropriate for the populations they serve.

Medicaid, a state-government-run program for Americans with incomes below the poverty line [4, 5], has been expanded to allow patients in need to have better access to care. To date, 28 states, including California, are moving forward with the Medicaid expansion [5]. The number of enrollees in the US was 50.9 million in 2009, reaching 68.9 million in 2015 [6]. When Medicaid coverage expands, hospitals are facing more racial/ethnic minority patients who are socioeconomically disadvantaged. Hence, it is relevant to discuss about ethnicity in the context of Medicaid expansion. Many are concerned that the new PPACA legislation will trouble hospitals that provide higher levels of Medicaid services since past findings showed that ethnic minority patients reported less favorable experience [7, 8]. Although past research has demonstrated the associations between Medicaid expansion, decreased mortality, and increased access to healthcare, few studies examined Medicaid expansion from the perspective of patient experience.

Historically, the availability of uniform, validated, and reliable data posed a major challenge in monitoring hospital patient experience. The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) dataset is the first publicly available, standardized US survey designed to gather valid and reliable information from adults about their inpatient care experiences [9]. It provides a rich set of patients' assessments of communication, information, and environment. Combining HCAHPS data with other hospital data allowed us to examine how patient composition and hospital characteristics affect patient experience. By evaluating the relation between patient experience and Medicaid/ethnicity concentration, we seek to better understand how these factors affect patient experience and the quality of patient-centered care delivered in US hospitals.

2 Conceptual Framework

The HCAHPS survey instrument [9] encompasses patient experience measures, namely staff responsiveness, communication with nurses and doctors, hospital environment, and care-related factors such as pain management, medication, and discharge information. Patient experience is a vital part of medical care outcome and a measure of patient-centeredness [2]. In his seminal work, Donabedian [1] treats interpersonal and amenity quality of healthcare providers as an important part of provider care quality. Ahmed et al. [10] posit that patient experience is a more objective concept relative to the subjective view of patient satisfaction. Patient experience can be influenced by factors such as socioeconomic status [7], overall health [11], and ethnicity [12, 13]. Studies have indicated that hospitals with high concentrations of Medicaid holders tend to receive unfavorable patient experience ratings [7, 8, 14].

The role of race/ethnicity is researched extensively and has been found to contribute to perceived patient experience; however, most of the studies focus on one or two minorities only. Hispanic and Black patients report more negatively compared with their White counterparts [12, 15, 16]. Stronger English language skills and health literacy positively influence patient experience for Hispanic patients [17]. In an earlier HCAHPS study, Asian patients reported more particularly unfavorable experiences than their Hispanic and Black counterparts [18]. Several scholars note the importance of properly accounting for and adjusting a hospitals' patient composition in order to achieve an acceptable patient experience rating for providers [10, 15].

Factors related to the care process, such as communication and information, also affect patient experience. Although previous studies argue that communication is the main influential factor for patient experience [19], the key problem might not be language comprehension but communication style and understanding individual preferences [20]. Information is also relevant to patient experience. Hospitals have adopted the use of medication and information discharge summaries (MIDS) to increase patients' medical knowledge and instruction compliance [21]. Hospital environment, including room safety, cleanliness, and noise level influence how patients perceive quality [22]. Teaching hospitals [23, 24] and hospitals located outside metropolitan areas [25, 26] tend to have better patient experience. Staffing is positively related to patient experience and care quality [27–29]. The objective of the present study was to investigate how hospital characteristics, especially the rates of Medicaid coverage and racial/ethnic minorities, impact the experiences of inpatients.

3 Methods

3.1 Empirical Model

We hypothesized, based on the literature review, that patient experience for hospital i (S_i) was associated with patient composition ($x1i$) factors such as socioeconomic status, overall health, and race/ethnicity. We controlled for hospital characteristics ($x2i$), such as staffing, teaching status, hospital location ($x3i$), and time trend ($x4i$). The notation σ_i represents residuals.

$$S_i = \beta x1i + \varphi x2i + \eta x3i + \lambda x4i + \sigma_i$$

The unit for analysis is hospital. The coefficient for ethnic concentration could be interpreted as the difference in patient experience rating between hospitals with and without high concentration.

3.2 Data Sources

This study analyzed hospital-level data drawn from several sources: (i) patient experience [HCAHPS data from the Center for Medicare and Medicaid Services (CMS) hospital comparison website [30] is our primary data source]; (ii) hospital patient composition variables, including Medicaid concentration, ethnic ratios, and average number of diagnoses from the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality (AHRQ) [31]; and (iii) other hospital characteristics, such as teaching status, geographic location, number of beds and staff, were evaluated using the 2010 American Hospital Association (AHA) Annual Survey [32].

Starting in 2007, Medicare required hospitals to administer the HCAHPS survey to randomly selected patients aged 18 years or older who have been discharged from their inpatient stay for between 48 h and 6 weeks. Estimates indicate that 85 % of inpatients at participating US hospitals are eligible to complete the survey. The development, implementation, and validity of HCAHPS have been discussed in detail in prior studies [33, 34].

The HCUP includes the largest collection of longitudinal hospital care data in the US. Its State Inpatient Databases (SID) contain inpatient discharge records from community hospitals in that state. The AHA defines community hospitals as all non-federal, short-term general, and other special hospitals [35]. Community hospitals represent the majority of hospitals in the US and provide the majority of short-term care to patients, i.e. a length of stay typically less than 30 days. The HCUP database is widely used for the analyses of US healthcare utilization [36, 37], and the AHA data contain hospital-specific data on approximately 6500 hospitals, including information on organizational structure, personnel, and hospital facilities. Data were linked by AHA and HCAHPS hospital ID.

The sample period for our study was 2009–2011. As the PPACA was legislated in 2010, the period may serve as a baseline period for the newly implemented VBP program between 2013 and 2015. There were 952 observations from 325 hospitals. The sample covered more than 94 % of the 345 hospitals in California [38], which is the single biggest state that accounts for more than 14 % of the US Medicaid enrollees. Ethnic minorities account for as high as 78 % of the Californian Medicaid enrollees, compared with a national average of 57 % [6].

3.3 Measures

3.3.1 Patient Experience

Our dependent variables were the patients' experience-of-care scores. The HCAHPS database has six composite measures, with each measure comprising of two or three survey questions regarding patient communications with nurses and doctors, staff responsiveness, pain and medication management, and discharge information. There are also two single questions regarding the cleanliness and noise level of the hospital environment, and two global measures: a 0–10 rating of the hospital and a measure of willingness to recommend the hospital. The percentage of patients at each hospital who responded to each question positively, meaning giving a score of '9' or '10', or 'would definitely recommend', constituted the hospital's score. The ten resulting HCAHPS scores were used as our dependent variables. The patient experience measures and corresponding questions are listed in Table 1 of the electronic supplementary material (ESM). The patient experience measures do not represent individual patient experiences; however, they allow comparison of patient experiences across hospitals that have different patient profiles, and have the benefit of identifying the potential aspects that hospitals should improve upon.

3.3.2 Hospital Patient Composition

The hospital patient composition variables reflected each hospital's Medicaid concentration, ethnic concentration, and overall patient health.

Medicaid concentrations: Medicaid concentrations represented the ratios of patients being Medicaid holders. For analysis purposes, hospitals were stratified according to the method of Werner et al. [39], by annual sample quartiles, so that interested readers could compare the current data with theirs. Hospitals in the bottom quartile were defined as having low Medicaid concentrations, while hospitals in the middle two quartiles and upper quartile were defined as having a middle and high Medicaid concentration, respectively. In high Medicaid concentration hospitals, at

least 26 % of patients had Medicaid coverage, whereas the middle concentration ranged from 8 to 25 %. The middle Medicaid group served as the reference group in the regression analyses, therefore concentrations at the two extremes were compared against the middle concentration. Coefficients for the high and low Medicaid concentration would be negative and positive, respectively.

Ethnic concentrations: Ethnic concentrations were measured by both relative and absolute thresholds due to the large difference in ethnic distribution. On average, Black and Asian patients accounted for only 6.7 and 7.5 % of patients in the sample hospitals, respectively, whereas Hispanic patients accounted for 24 %. Hospitals with concentrations of ethnic minority over the median would have over 9 % of patients being Black or Asian, but the comparable figure would be 17 % for the Hispanic patients. Hence, a set of dummy variables for a hospital with its ethnic concentration above the annual median and top quartile, and variables representing minorities of more than 15 and 20 % of total discharges, were used to illustrate how coefficient estimates vary with different ethnic minority concentrations.

Health: The mean number of diagnoses on the patient's record represented 'patient health'. Demographic variables, such as patient sex and average age at admission, were reported but were not included in regression analyses because HCAHPS satisfaction reports are adjusted for sex and age.

3.3.3 Hospital and Market Characteristics

Hospitals were categorized by teaching status, and the number of full-time equivalent (FTE) personnel was divided by total hospital beds. Because the number of personnel is likely to increase with the size of hospital, it is divided by the number of beds to represent a standardized staffing availability. The hospital market variable was a dummy variable for urban hospitals, and the reference year was 2009. The time trend was measured using two dummy variables for 2010 and 2011 to control for any policy or environment change.

3.4 Estimating Method

The patient experience was a continuous and approximately normally distributed variable with a limited range between 0 and 100. Hospitals might be observed multiple times and thus the error terms might be correlated, which violates the independence assumptions of the traditional ordinary least square regressions. A generalized estimating equation (GEE) approach would correct such standard errors for the coefficient estimated by taking into account the error correlations [40]. The intercept terms represented the expected ratio of patients giving very positive response

with the measured experience. The estimated coefficients represented the average difference in positive ratings for hospitals with respect to certain characteristics. For example, the coefficient of high Medicaid concentration on pain control can be interpreted as the difference in positive ratings between hospitals of high and middle Medicaid concentrations. There were several possible assumptions regarding how the errors correlate. With no specific known structures, we reported results with the assumption of unstructured errors. Wald Chi-squares were used to test whether estimates for ethnic coefficients had the same value for each patient experience measure. Stata 12 was used for the linear regression GEE estimation.

4 Results

There were a total of 952 hospital observations from the AHA, but 82 observations had missing patient experience variables because pediatric, psychiatric, and specialty hospitals were excluded from participating in the HCAHPS process. The resulting sample with complete data was used in our GEE estimates and represents 80 % of all hospitals in California. The characteristics of hospitals with missing patient experience variables are shown in Table 2 of the ESM. No significant differences were noted in the Medicaid coverage.

Table 1 presents hospital characteristics and patient experience by Medicaid concentrations. Compared with hospitals with low and middle Medicaid concentrations, hospitals with high Medicaid concentrations had higher concentrations of racial/ethnic minorities but smaller numbers of diagnoses. The average ratio of Hispanic, Black, and Asian/Pacific Islander (PI) patients in hospitals with high Medicaid concentrations was 45, 11, and 8 %, respectively. Hospitals with high Medicaid concentrations were more likely to be teaching hospitals, be located in an urban area, and possess fewer FTE personnel per bed.

The bottom half of Table 1 displays the patient experience rating by Medicaid concentration. Positive ratings tended to decrease as Medicaid concentration increased. Average positive ratings varied across experience measures. The average positive ratings for discharge information provision and communication with doctors were high (80 %), but rating for room quietness was very low (47 %).

Table 2 presents the GEE estimates for each patient experience measure. Comparing hospitals with high concentrations of Medicaid patients with those in the middle concentrations of Medicaid patients shows negative impact on the patient experience scores of approximately 1 %. Six of the ten patient experience measures with negative coefficients on the high Medicaid patient concentration were statistically significant with three measures

Table 1 Hospital characteristics and patient experience by Medicaid concentration

<i>n</i> =	Total 870 [Mean (SD)]	Medicaid low 220 [Mean (SD)]	Medicaid middle 434 [Mean (SD)]	Medicaid high 216 [Mean (SD)]
Hospital patient composition				
Age ^a (years)	61.44 (11.34)	67.92 (8.53)	63.64 (7.33)	50.42 (12.81)
Female ^a (yes = 1)	0.52 (0.06)	0.51 (0.09)	0.51 (0.06)	0.49 (0.07)
Ethnicity				
White ^a (%)	59.85 (27.39)	74.52 (20.64)	65.08 (23.92)	34.46 (22.93)
Hispanic ^a (%)	24.30 (22.33)	11.81 (11.90)	20.27 (17.84)	44.93 (25.98)
Black ^a (%)	6.67 (9.99)	5.08 (8.83)	5.50 (7.75)	11.08 (13.31)
Asian/PI ^a (%)	7.48 (11.99)	7.40 (13.13)	7.37 (11.86)	7.86 (11.11)
Other ^a (%)	1.70 (2.93)	1.19 (1.59)	1.98 (3.39)	1.66 (2.93)
Hispanic ≥ 20 % ^a (yes = 1)	0.45 (0.50)	0.18 (0.08)	0.39 (0.49)	0.84 (0.37)
Black ≥ 20 % ^a (yes = 1)	0.08 (0.27)	0.08 (0.27)	0.05 (0.21)	0.15 (0.36)
Asian/PI ≥ 20 % ^b (yes = 1)	0.11 (0.31)	0.08 (0.27)	0.11 (0.30)	0.13 (0.34)
Number of diagnoses ^a	5.15 (1.31)	5.79 (1.46)	5.19 (1.11)	4.08 (1.32)
Hospital and market				
Teaching ^a (yes = 1)	0.35 (0.48)	0.24 (0.43)	0.15 (0.36)	0.35 (0.48)
FTE personnel per bed ^b	5.91 (2.59)	6.19 (2.63)	5.78 (2.53)	5.67 (2.73)
Urban ^b (yes = 1)	0.98 (0.13)	0.99 (0.10)	0.97 (0.16)	0.99 (0.07)
Year 2009 (yes = 1)	0.32 (0.46)	0.32 (0.46)	0.32 (0.47)	0.33 (0.47)
Year 2010 (yes = 1)	0.34 (0.47)	0.33 (0.47)	0.34 (0.47)	0.34 (0.47)
Year 2011 ^b (yes = 1)	0.33 (0.47)	0.33(0.47)	0.32 (0.46)	0.32 (0.47)
Patient experience				
Rate hospital high ^a (%)	64.08 (9.38)	66.61 (9.22)	64.10 (9.48)	61.46 (8.63)
Willing to recommend ^a (%)	67.44 (10.69)	70.86 (9.70)	67.74 (10.88)	63.36 (9.92)
Communication–doctor ^a (%)	76.07 (5.11)	77.85 (4.63)	76.01 (4.79)	74.34 (5.60)
Communication–nurse ^a (%)	70.69 (6.29)	72.61 (5.67)	71.24 (6.22)	68.17 (6.35)
Staff responsiveness ^a (%)	57.41 (8.09)	59.32 (7.76)	57.71 (8.00)	54.99 (6.87)
Medication ^a (%)	56.61 (6.30)	57.90 (5.54)	56.73 (6.016)	54.58 (7.80)
Pain management ^a (%)	66.06 (6.35)	67.62 (5.74)	66.20 (6.50)	64.12 (6.15)
Discharge information ^a (%)	79.66 (5.06)	81.10 (4.50)	79.84 (5.00)	77.81 (5.16)
Room quietness ^a (%)	47.42 (7.98)	48.57 (8.60)	47.20 (7.53)	46.59 (8.06)
Room cleanliness ^a (%)	67.86 (6.79)	68.75 (6.55)	68.44 (6.73)	65.75 (6.72)

SD standard deviation, *FTE* full-time-equivalent, *PI* Pacific Islander

^a Significant at 0.05 level

^b Significant at 0.1 level

(‘definitely willing to recommend to family and friends’, ‘nurses always communicated well’, and ‘staff always communicated well about medications’) showing the largest negative impacts.

Due to the very large differences in the distribution of Hispanic vis-a-vis Black and Asian patients, to make evaluation of hospitals with high concentrations of minority patients easily comparable, we used three dummy variables to identify hospitals with high concentrations (≥ 20 %) of Hispanic, Black, and Asian patients. Of the 30 coefficients in Table 2 representing the three racial/ethnic groups in ten patient-experience measures, 28 of the 30 coefficients had

negative signs, with 22 of the 30 negative coefficients being statistically significant. In general, high concentrations of Black and Asian patients typically had large negative impacts for nine of the ten patient experience measures, with the exception of medication and discharge information. When comparing the patient experience for hospitals with a high concentration of Black and Asian patients, a higher Asian-patient hospital population had the greatest negative impacts. Of interest, Table 2 shows that hospitals with a high Hispanic concentration received 1.05 % significantly higher positive ratings on the patient experience measure ‘rooms were always quiet at night’. In contrast, hospitals

Table 2 Linear regression GEE estimates by patient experience ($N = 870$)

	Rate hospital high	Willing to recommend	Communication- doctor	Communication- nurse	Staff response	Medication	Pain	Discharge	Room quiet	Room clean
Hospital patient composition										
Medicaid (omitted = middle)										
Low	1.10	1.20	1.02 ^a	0.34	0.99	0.60	0.91 ^b	0.55	0.84	0.05
High	-0.48	-1.26 ^a	-0.78	-1.50 ^a	-1.26 ^b	-1.13 ^b	-0.79	-0.99 ^a	-0.13	-1.18 ^b
Number of diagnoses	0.19	0.24	0.03	-0.06	-0.12	-0.08	-0.03	0.05	0.09	0.09
Hispanic ≥ 20 %	-0.69	-1.93 ^a	-0.84 ^a	-1.02 ^a	-1.14 ^b	-0.52	-0.93 ^b	-0.88 ^a	1.05 ^b	0.24
Black ≥ 20 %	-2.50 ^a	-2.74 ^a	-1.18 ^b	-2.64 ^a	-2.90 ^a	-1.24	-2.11 ^a	-0.99	-0.41	-2.25 ^a
Asian ≥ 20 %	-3.34 ^a	-2.76 ^a	-1.28 ^a	-2.14 ^a	-2.07 ^a	-1.04	-2.90 ^a	-0.26	-1.61 ^b	-2.74 ^a
Hospital and market										
Teaching	2.78 ^a	3.18 ^a	1.25 ^a	0.90 ^a	0.98	1.28 ^a	0.91	1.23 ^a	-0.57	-0.14
FTE personnel per bed	0.00	0.07	0.02	0.00	-0.03	0.10	-0.05	0.64	-0.07	-0.09
Urban	-6.65 ^a	-5.40 ^b	-4.33 ^a	-5.18 ^a	-7.55 ^a	-4.99 ^a	-4.63 ^a	-2.92 ^a	-7.91 ^a	-8.11 ^a
Year 2010	1.39 ^b	0.67	0.26	1.13 ^a	0.92	0.81	0.78	1.28 ^a	-0.45	0.92 ^b
Year 2011	2.34 ^a	0.84	0.83 ^a	2.27 ^a	2.51 ^a	2.54 ^a	1.42 ^a	2.52 ^a	0.98	1.54 ^a
Intercept	67.12 ^a	69.97 ^a	80.24 ^a	76.82 ^a	66.20 ^a	61.34 ^a	71.02 ^a	79.79 ^a	54.93 ^a	73.98 ^a
χ^2 (2), for ethnic coefficient equality	4.55	0.79	0.43	3.85	2.42	0.72	5.27 ^b	0.93	5.91 ^b	12.67 ^a

GEE generalized estimating equation, FTE full-time equivalent

^a Significant at 0.05 level^b Significant at 0.1 level

with higher Asian concentrations received 1.61 % lower ratings on the room quietness measure than that of hospitals with lower Asian concentrations. Wald Chi-squares reported at the bottom of Table 2 indicate that racial/ethnic effects regarding pain management, room quietness, and cleanliness were significantly different across racial/ethnic groups. The asymmetric ethnic effects may have reflected cultural differences of ethnic minority patients in hospital expectations and in interpreting and answering questions [41].

Several other hospital characteristics significantly affected the patient's hospital experience. Hospitals that engaged in teaching activities, and training interns and residents, displayed a positive impact on the patient's experience for eight of the ten patient measures, with six of the ten being statistically significant. Urban hospitals received at least 2.9 % lower ratings on all patient experience measures. The year coefficients for 2010 and 2011 showed that there has been a steady improvement in patient satisfaction scores compared with 2009.

Table 3 presents the ethnic effects on patient hospital experience by racial/ethnic concentrations, while also controlling for other hospital characteristics shown in Table 2. Results from three different racial/ethnic concentration thresholds were reported: (i) an absolute ratio of 15 %; (ii) the top quartile of each ethnicity (approximately 9 % for Black and Asian/PI patients and 33 % for Hispanic patients); and (iii) the median concentration level for each racial/ethnic group. Similar to Table 2, for all three racial/ethnic groups the coefficients are typically negative, with a majority of the coefficients being statistically significant. Hospitals with high concentrations of Black patients, for example, have negative coefficients for every measure in all three thresholds. While we would expect the racial/ethnic effects to differ based on the threshold chosen, the fact that all three measures show consistent results suggests, consistent with the hypothesis, that higher levels of racial or ethnic concentrations in hospitals have a negative impact on patient experience scores, is strongly supported.

Interestingly, in Table 2, when racial/ethnic concentration thresholds were set at 20 %, Wald Chi-square tests indicated patient experience regarding pain management, room quietness, and room cleanliness were significantly different among the racial and ethnic groups. However, when we drop to a 15 % threshold, as shown in Table 3, the Wald Chi-square scores for these three patient satisfaction measures were no longer significantly different, for these measures or any of the other patient experience measures, among the racial and ethnic minorities. We would interpret the Wald Chi-square results in Tables 2 and 3 to suggest that differences among the racial/ethnic minority are most pronounced for the pain management and room adequacy measures and, while consistently negative across all ten measures, do not typically vary among the three racial/ethnic groupings.

5 Discussion

The empirical results confirmed that patient experience varies with Medicaid and ethnic minority concentration. Several implications could be drawn from these results. First, in line with previous research findings, hospitals with high concentrations of Medicaid holders and ethnic minority patients systematically reported worse patient experience on the HCAHPS. As the VBP hinges on the patient experience rating, those hospitals serving more Medicaid patients would be challenged to formulate financially viable strategies for providing patient-centered care. When the ethnic effects vary with ethnicity and their share in discharges, as shown in this study, further research is called for investigating to what extent the ethnic concentration effect may change relative to the size of the minority patient population in a hospital. This challenge of receiving a less favorable rating of patient experience could be especially pronounced with those minorities, such as Asian/PI and Hispanic patients, whose English-language skills may be limited or non-existent [20–22]. The language barrier may partially explain the particularly low satisfaction for Asian patients noted in an earlier HCAHPS survey [18], as well as a study in the UK [12]. The fact that the category of Asian/PIs includes patients from very diverse groups might also impede the hospital's effort in providing patient-centered care. Weinick et al. [41] used standardized encounters to examine whether ethnic disparities in patients' experience with communication with doctors resulted from experience or expectation. They concluded that experience is most likely the cause of the disparity. Aside from the language factor, communication style and understanding of individual preferences may also account for lower communication ratings [25]. Varying subcultural customs and perceived adequate communication styles might also be challenging to the healthcare providers. A previous study has reported perceived disrespectfulness of the providers as a factor for the low ratings among the Black population [16]. For many chronic conditions that Medicaid holders tend to have, communication about medication usage and pain management could be pivotal for the perceived experience. Both aspects were shown to significantly impact on perceived patient experience. The core of these communication issues resonates well with the current emphasis on cultivating patient-centered mentality of the caregivers who are to treat every patient as a unique individual so as to try their best to empower the patient to care for not only their illness but general well-being.

The notion of fewer personnel per patient being a possible damper to quality of care was not confirmed with this study. Although FTE personnel per bed was lower for

Table 3 Estimates for ethnic effects on patient experience by ethnic concentration ($N = 870$)

	Rate hospital high	Willing to recommend	Communication- doctor	Communication- nurse	Staff Response	Medication	Pain	Discharge	Room quiet	Room clean
Ethnic concentration measures										
By 15 % threshold dummy										
Hispanic ≥ 15 %	-1.0	-2.23 ^a	-0.82 ^a	-1.24 ^a	-1.67 ^a	-0.78	-1.40 ^a	-1.10 ^a	0.83	-0.28
Black ≥ 15 %	-2.54 ^a	-2.65 ^a	-1.17 ^a	-1.96 ^a	-2.54 ^a	-0.95	-1.97 ^a	-0.99 ^a	-0.21	-1.99 ^a
Asian ≥ 15 %	1.53 ^b	-1.07	-0.84 ^b	-0.94 ^a	-1.0	-0.52	-1.41 ^a	-0.26 ^a	-0.88	-1.23 ^b
$\chi^2_{(2)}$ for coefficient equality	1.78	1.22	0.33	1.43	1.82	0.22	0.56	1.79	3.19	4.32
By top quartile										
Hispanic \geq top quartile	0.07	-1.67 ^a	-0.56	-0.61 ^a	-0.81 ^a	-0.00	-0.67	-0.54	0.47	0.69
Black \geq top quartile	-1.81 ^a	-1.86 ^a	-0.82 ^b	-1.57 ^a	-1.45 ^a	-0.96 ^b	-1.34 ^a	-1.01 ^a	-0.03	-1.29 ^a
Asian \geq top quartile	-1.89 ^a	-1.53 ^b	-0.79 ^b	-1.12	-0.99	-0.73 ^a	-0.95 ^a	-0.92	-0.56	-1.24 ^a
$\chi^2_{(2)}$ for coefficient equality	3.92	0.07	0.24	1.76	0.46	1.86	0.77	2.11	1.28	8.52 ^a
By median										
Hispanic \geq median	-0.44	-1.71 ^a	-0.6	-0.66 ^a	-1.19 ^b	-0.42	-1.05 ^a	-0.86 ^b	0.99	0.17
Black \geq median	-1.63 ^a	-1.71 ^a	-0.75	-1.31 ^a	-1.44 ^a	-1.21 ^a	-0.85 ^b	-0.59	-0.09	-1.55 ^a
Asian \geq median	-0.85 ^a	-0.72 ^a	-0.49	-1.02 ^a	-1.10 ^a	-0.69	-0.78	-0.32	-0.14	-1.06 ^a
$\chi^2_{(2)}$ for coefficient equality	1.25	0.96	0.14	0.81	0.19	1.05	0.14	0.93	2.01	5.12 ^a

^a Significant at 0.05 level^b Significant at 0.1 level

hospitals with a high Medicaid concentration, the GEE estimates did not show a significant association between FTE personnel per bed and satisfaction ratings (except discharge ratings). Allocation of resources depends on accurately assessing the individual drivers for desirable patient experience. Studies have lumped both environmental quietness and cleanliness into one measure for improvement. This study shows less desirable experience occurs only with noise but not cleanliness. The worst patient experience was for the level of noise control in hospital rooms regardless of Medicaid concentration or ethnicity. This seems to indicate that the control of noise might continue to be a problem that requires attention. On the other hand, patients of various ethnic groups responded differently to room cleanliness. The effort of hospitals is recommended to gather individual insights as to how and what aspects of cleanliness are of concern. When hospitals are operating under budgetary constraints, it is crucial to discern the areas of improvement that truly provide patients with desirable benefits.

A critical part of the CMS's mission is to transition from being merely a healthcare payer to becoming a value-based purchaser [42, 43]. In December 2012, Medicare announced the VBP program methodology. This policy may impact the level of revenue for hospitals that are continuously receiving a less favorable patient experience rating [44]. Our results alert to the possibility of financially hurting those hospitals that have higher concentrations of Medicaid and ethnic minority patients if the VBP scheme treats the experience of patients uniformly regardless of the compositions of patient population that each hospital is servicing. Lower incentive payment equates to fewer monetary resources to allocate towards improving hospital operations. In a sense, it could create a perpetual downward spiral and impediment to the efforts of those hospitals with a high Medicaid concentration in providing patient-centered care to the underserved. It is also up to the providers to strategize and improve the value-based services so that they are able to retain financial viability when serving Medicaid beneficiaries who tend to experience more chronic conditions.

A few limitations of this study should be noted. The regression estimates were derived from hospitals in California, and these estimates were not to be taken as an attempt to explain the patient experiences of all US hospitals. Instead, we used the California data to exhibit that, in a state that consisted of many Medicaid enrollees and ethnic minorities, concentrations of Medicaid and ethnic minorities still affected patient experience. Although HCAHPS has been tested with regard to its modes of data collection [34] and has been used as part of the VBP program, its national response rate average was approximately 33, and 30 % in California [45]. The validity [33] of

measures have been debated; however, HCAHPS is still the only industry benchmark at this stage. As a result of the sample exclusion, we compared hospitals with similar levels of Medicaid and ethnic concentrations, and the concentration levels still showed significant effects. This might also explain the lack of significant effect for hospitals with low Medicaid concentrations.

6 Conclusions

Patient experience is becoming a critical measure of healthcare service quality that has implications for the payment system to hospitals, particularly after the implementation of the VBP program by the CMS in 2013. The new formula emphasizes the patient experience domain, whereas the previous formula focused more on clinical competence and outcome. The current study confirms previous findings that hospitals with higher concentrations of Medicaid recipients and ethnic minorities tend to perform less favorably in terms of patient experience. For hospitals to be able to continue serving the underserved and remain financially viable, they are compelled to strategize to manage the pressing demands for both quality and efficiency. In this study, all response rates have been derived from data aggregated across patients. Future studies should investigate data on an individual level. Understanding the perceptions of individual stakeholders is essential for aligning values among stakeholders. On that basis, hospitals are in a better position to strategically allocate their limited resources for generating optimal benefits for individual patients.

Author contributions Sandra Liu developed the conceptual framework, coordinated the study, reviewed relevant literatures, and drafted and revised the manuscript; Yu-Ping Wen conducted the data analyses, reviewed relevant literatures, and drafted the manuscript; Soumya Mohan reviewed the relevant literatures, and drafted the manuscript; Jaeyong Bae compiled the data and revised the manuscript; and Edmund R. Becker developed the conceptual framework, coordinated the study, reviewed the relevant literatures, and revised the manuscript.

Compliance with Ethical Standards

Conflict of interest Sandra S. Liu, Yu-Ping Wen, Soumya Mohan, Jaeyong Bae, and Edmund R. Becker declare that they have no conflicts of interest.

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