

Patient Satisfaction and Hospital Structure: How Are They Related?

Mingfei Li, Alina Chircu, Gang Li, Lan Xia, and Jennifer Xu^(✉)

Bentley University, Waltham, MA, USA
{mli, achircu, gli, lxia, jxu}@bentley.edu

Abstract. This paper investigates the multiple dimensions of patient satisfaction measured by the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey in the United States. The analysis reveals that even the highest rating hospitals do not excel on all dimensions of satisfaction. While satisfaction levels with nurse and doctor communication are high, satisfaction levels with discharge information and explanation of medications could be significantly improved. In addition, low rating hospitals seem to be doing better than the high rating hospitals on these critical dimensions for the quality of care. The paper also investigates how hospital structural characteristics captured in the American Hospital Association (AHA) survey affect different dimensions of patient satisfaction. The analysis reveals that these structural factors may have differential effects, i.e. the type of hospitals (e.g., teaching vs. non-teaching) has a relatively small effect on the hospital room environment than on communication and responsiveness. The results suggest that considering all patient satisfaction dimensions helps provide a more accurate picture of the care received by patients, makes it possible to pinpoint specific areas where hospitals are deficient that are not reflected in the overall satisfaction scores, and assists hospital management to design actionable strategies for improvement.

Keywords: Patient satisfaction · Quality of care · Hospital structure

1 Introduction

Quality of care has long been a key performance indicator in the healthcare industry. Although there is a lack of consensus on the definition of quality of care [26], most healthcare professionals believe that an important component of this metric is patient satisfaction [8, 9, 11], which refers to the opinions and attitudes of patients toward the health services they receive from their healthcare providers. In his seminal paper on healthcare quality assessment, Donabedian stated that the ultimate criterion for quality is about achieving and producing health and satisfaction [9].

The focus on patient satisfaction concurs with several recent trends in the healthcare industry. One of these trends is the growing acceptance of the concept and practice of patient-centered care. While continuing to maintain and improve clinical outcomes, healthcare providers also try to enhance patient experience and perceptions of the service quality. Meanwhile, healthcare regulators and associations have adopted a market-driven approach, which takes a consumer perspective, when evaluating the

overall performance of healthcare institutions. Moreover, the rising patient expectations, growing medical expenses, and emerging medical technologies have spurred stronger competitions among healthcare organizations, which face constant evaluation and comparison. As result, hospital and clinic managements are striving to seek effective strategies and approaches to improve patient satisfaction and to achieve high quality of care. In the U.S., the Hospital Consumer Assessment of Health Plans Survey (HCAPHS) has been widely used as a tool for patient satisfaction assessment.

There have been a number of studies in the literature that examine patient satisfaction and its determinants. It has been found that in addition to patient individual characteristics, the process of service (e.g., how physicians and nurses interact with patients) and the outcome of service (e.g., hospital readmission rate) all have impact on how patients perceive the quality of care they receive. However, most of these studies have investigated the global satisfaction score without examining the multiple, individual dimensions of satisfaction. In the case of HCAPHS, for example, the majority of findings only concern the single survey question focusing on the overall patient satisfaction. Furthermore, although significant insights have been gathered into the roles of service process and outcome, little is known about how structural characteristics of a healthcare organization affect its patient satisfaction. Consequently, it is difficult for hospital management to utilize these research findings in practice and to design effective strategies for performance improvement.

We propose to bridge these research gaps in the study of patient satisfaction by addressing two research questions in this paper:

- RQ1: How are individual dimensions of patient satisfaction related to the overall satisfaction? What other information do these dimensions reveal in addition to the overall satisfaction?
- RQ2: How do the structural characteristics of a healthcare organization affect different dimensions of patient satisfaction?

The remainder of this paper is organized as follows. The next section reviews the literature on patient satisfaction. Section 3 presents our data and methods. The analysis and results are reported in Sect. 4. The Sect. 5 discusses the implications and limitations of this research and concludes the paper.

2 Literature Review

2.1 Patient Satisfaction

Patient satisfaction has been regarded as an important criterion in the assessment of quality of healthcare. Patient satisfaction scales provide feedback and information that can help performance improvement, strategic decision-making, and effective hospital management [2]. It has been found that patient satisfaction is associated with several healthcare quality indicators such as emergency department use and inpatient use, healthcare expenses, and mortality [11]. Various factors may have impact on patient satisfaction. Based on a meta-analysis of 221 studies, Hall and Dornan identified 11 factors related to patient satisfaction: overall satisfaction, humanness, technical competence, outcome,

physical facilities, continuity of care, access, amount of information, cost, organization, and attention to psychological problems [14]. Cleary and McNeil categorized the determinants of patient satisfaction into four groups, which include patient characteristics and three characteristics of care: structure, process, and outcome [8]. Patient socio-demographics (e.g., age, gender, income, education, and health status) and patient expectations regarding the doctors, nurses, and treatments, etc. are individual characteristics of patients. The structure of care includes the organization and financing of care and the accessibility and continuity of care. The process of care refers to the technical aspect (e.g., the perceived competence, skills, and qualifications of the care provider) and interpersonal aspect (e.g. the communication and interaction between the patient and provider). Outcomes of care have been measured by readmission rate, mortality, and improvement of health condition.

A number of studies have examined the impacts of personal characteristics, care process, and care outcome on patient satisfaction. It has been found that age, gender, education, and health status were significantly correlated with patient satisfaction [7, 11, 15]. The fulfillment of expectation has also been shown to influence patient satisfaction [4]. Marley et al. proposed a causal model that focuses specifically on the role of hospital management's leadership, process of care, and outcome of care [20]. They found that the senior executives' participatory leadership had a stronger impact on the process quality, which was primarily concerning the patient-provider communication and interaction, than on clinical outcomes (e.g., readmission); and both the process and outcome quality influenced patient satisfaction. Boulding et al. reported that higher overall patient satisfaction and satisfaction with discharge planning were associated with lower 30-day readmission [5]. In terms of the interpersonal part of care process, Schoenfelder et al. found that, following the treatment outcome, the kindness of nurses was the second most salient predictor of patient satisfaction [24]. Being treated with courtesy by nurses and doctors has also been found to be the highest patient priority in other studies [21].

Although significant progress has been made in the research of patient satisfaction, only a limited number of studies have investigated the roles that the care structure plays in patient satisfaction and their findings are often mixed. Ghaferi et al. studied five hospital-level structural characteristics, including teaching status, hospital size, average daily census, nurse-to-patient ratios, and hospital technology, and found their significant impacts on the quality of care related to pancreatectomy [12]. However, another study reported that higher patient satisfaction was reversely associated with hospital size [3]. Hekkert et al. reported that hospital-level determinants (e.g., hospital size, hospital type) were less important for predicting patient satisfaction than individual characteristics of patients [15]. Similarly, some research shows that except for accessibility, other organizational features such as office staffing and visit-based continuity are not associated with any of the clinical quality indicators [25]. However, based on a survey of nurses and patients in a large number of European and U.S. hospitals, Aiken et al. recommended that improving nurse staffing (i.e., a higher nurse-to-patient ratio) could be a relatively low cost strategy to enhance healthcare quality and patient satisfaction [1]. In addition, Cheng et al. found that the associations between hospital accreditation status (e.g., medical center or regional hospital) with patient satisfaction

were significant for diabetes related procedures, but not for other procedures (e.g., stroke, appendectomy) [7].

This research seeks to delve deeper into the impact of structural characteristics of healthcare organizations on patient satisfaction, which is measured using standard survey instruments such as the HCAHPS survey.

2.2 The HCAHPS Patient Satisfaction Survey

A relatively recent development in the measurement of patient satisfaction in the United States is the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey (also known as the CAHPS survey). The HCAHPS survey was launched in 2006 on a voluntary basis, and became a national standard in 2008, when federal hospital payments were linked to survey outcomes and periodic public reporting of survey results was implemented [13]. According to publicly available fact sheets on the survey website (<http://www.hcahpsonline.org>), 2,421 hospitals reported survey results based on 1.1 million completed patient surveys. These numbers increased to 3,928 reporting hospitals and 3.1 million completed surveys in July 2013 and to 4,167 hospitals and more than 3.1 million completed surveys in April 2015. It is estimated that almost 90% of all eligible hospitals are reporting patient satisfaction data using HCAHPS [13].

The main purpose of HCAHPS is to provide uniform measurement and public reporting of patient's satisfaction with their hospital inpatient care, with the goal of improving the quality of care by providing feedback to hospitals regarding patient perceptions of different aspects of their care [13]. To this end, the current version of the survey reports seven composite measures (nurse communication, doctor communication, responsiveness of hospital staff, pain management, communication about medicines, patient understanding of the care needed after discharge, and discharge information), two individual measures (cleanliness of hospital environment, quietness of hospital environment), and two global measures of patient satisfaction (overall rating of hospital and willingness to recommend hospital). The results are reported as aggregates of individual scales in the following categories: strongly agree/agree/disagree or strongly disagree (understanding of care), yes/no (discharge information provided), yes definitely/yes probably/no probably (willingness to recommend), 9 or 10/7 or 8/6 or lower (overall rating), and always/usually/sometimes or never (all other measures).

The survey is administered to a random sample of eligible adult patients with at least one overnight inpatient stay and alive at discharge. The following categories are excluded from the sample: pediatric patients (under 18 years of age), psychiatric patients, prisoners, patients with a foreign home address, patients discharged to hospice or nursing care, and "no publicity" patients (i.e. patients who, at admission, opt out from information disclosure and from being surveyed). The survey can be administered directly by the hospital or using a survey vendor, and is available in four modes (mail, telephone, mail with telephone follow-up, or active interactive voice recognition). Finally, the survey results are adjusted for survey mode and hospital-specific patient characteristics, which are factors outside of a hospital's control that can affect the results, as well as for non-response bias [13, 19, 27].

Most existing studies based on HCAHPS data use only the global patient satisfaction measures (overall rating and willingness to recommend) [6, 23], a combination of these global measures and selected satisfaction items [16, 18], or a summary patient experience score combining all HCAHPS survey measures [10, 19]. These studies highlight the characteristics of top performing hospitals on the summary score [19], show how these summary scores increase over time [10], link staffing decisions for nurses and doctors to selected satisfaction measures [6, 16, 18], and investigate structural reasons (such as presence of psychiatric beds) for lower global satisfaction scores [23].

While global or summary patient satisfaction measures are useful in understanding trends across time or quickly identifying top performing hospitals, they do not offer actionable recommendations for improving quality of care. Instead, the nine HCAHPS measures of satisfaction with specific aspects of the hospital experience may be more useful. Preliminary studies conducted on the raw HCAHPS data show that despite some reliability and validity deficiencies, some of these specific satisfaction measures have significant positive impacts on the overall hospital rating, which in turn positively affects the willingness to recommend the hospital. However, some measures (such as quietness and discharge information) do not show significance, while others (cleanliness, communication about medicines, and responsiveness of hospital staff) only have significant impacts on overall satisfaction for some hospitals, but not others [27]. We believe there is a clear need for further studies using the multiple aspects of patient satisfaction, rather than only the global overall satisfaction measures.

3 Data

To examine the multiple aspects of patient satisfaction and the impact of hospital structural characteristics, we combined the latest available American Hospital Association (AHA) annual survey data (2013) with the corresponding HCAHPS survey data (2013–2014) for all reporting hospitals in the state of New York. The resulting sample contains 164 hospitals. All these hospitals are Medicare-certified by the U.S. Department of Health and Human Services.

Major hospital characteristics included in the analysis are number of full time nurses and doctors (per bed), total hospital expense, hospital's service area, and whether the hospital provides residency training or is the sole community provider. Patient satisfaction data include all measures available in the HCAHPS survey, including the two overall satisfaction scores (e.g., the star rating) and the nine specific satisfaction dimensions (e.g., room cleanliness, doctor communication) (see Sect. 2.2). For each variable, we use the percent of patients whose answers are in the top reported level (always, strongly agree, 9 or 10, definitely yes, or yes, respectively, depending on scale). For example, if 60% of patients reported that "the room and bathroom were always clean", the hospital receives a measure of 60% for room cleanliness. Descriptive statistics for these hospital basic structure and patient satisfaction measures are shown in Table 1.

Table 1. Descriptive statistics for hospital structure and patient satisfaction

Hospital structural characteristics		Count	%	
Service area	Division	66	45	
	Metro	47	32	
	Micro	24	16	
	Rural	11	7	
Residency training (MAPP3)	1 yes	59	40	
	0 no	89	60	
Sole community provider (MAPP20)	1 yes	15	10	
	0 No	133	90	
	<i>Mean</i>	<i>Std</i>	<i>Max</i>	<i>Min</i>
Total hospital expense (EXPTOT, in million)	349.2	504.4	4062.4	8.28
Total hospital beds (HOSPBD, in hundreds)	3.2	3.0	23.6	0.04
Full time doctors (per bed)	1.8	4.7	30.7	0.00
Full time nurses (per bed)	1.3	0.7	3.2	0.16
<i>Patient satisfaction</i>	<i>Mean</i>	<i>Std</i>	<i>Max</i>	<i>Min</i>
Room/bathroom cleanliness (<i>roomclean</i>)	69.8%	0.081	100	51%
Quietness of hospital environment (<i>roomquiet</i>)	52.0%	0.075	78	37%
Nurse communication (<i>nurcom</i>)	75.3%	0.062	97	60%
Doctor communication (<i>doccom</i>)	77.4%	0.043	93	68%
Responsiveness of staff (received help as soon as wanted) (<i>response</i>)	61.2%	0.099	96	37%
Pain control (<i>paincon</i>)	66.9%	0.066	93	53%
Communication about medication before administration (<i>staffmed</i>)	60.7%	0.064	94	46%
Discharge information (<i>infohome</i>)	16.1%	0.048	29	6%
Understanding of care (<i>understood</i>)	46.8%	0.060	62	6%
Overall hospital rating (<i>hosrate</i>)	63.1%	0.099	91	42%
Willingness to recommend (<i>recom</i>)	65.5%	0.106	97	41%
<i>Combined service quality dimensions</i>	<i>Mean</i>	<i>Std</i>	<i>Max</i>	<i>Min</i>
Communication (combined nurse and doctor communication)	76.3%	0.049	90	64%
Environment (<i>roomevir</i>) (combined cleanliness and quietness)	60.9%	0.070	82	44%
Responsiveness (combined pain control and responsiveness of staff)	64.0%	0.079	95	47%

4 Analysis and Results

The analysis showed that all the nine specific satisfaction measures significantly correlate with the overall star rating. However, patients' satisfactions vary with different items. We found significant difference among levels of satisfaction for different aspects of the hospital experience, with the highest satisfaction achieved on nurse and doctor communication (75.3% and 77.4%) and the lowest satisfaction achieved on discharge

information provision (16.1%) and explanation of medications before administration (46.8%) (see Table 1). Even the top rating hospitals did not achieve high satisfaction on all dimensions. A regression analysis shows that discharge information provision and medication explanation are negatively associated with the two overall satisfaction scores (all $ps < 0.001$).

Figure 1 presents a radar map that illustrates the differences among six selected hospitals' performance on these nine individual satisfaction items. These hospitals are represented by six colored polygons. Each polygon was constructed by connecting the nine satisfaction scores of a hospital using colored lines: blue, light green and light purple are three hospitals with recommendations great than 73% (i.e. over 73% of the patients said they would definitely recommend the hospital), and with the overall star rating equal to or greater than 4 out of 5. The red, green, and purple polygons are the other three hospitals with recommendations less than 50%, and with the overall rating less than or equal to 1 out of 5. This visual representation is fairly easy to interpret. In general, the bigger a polygon's size is, the higher the corresponding hospital's scores are. It can be seen that high rating hospitals performed very well on doctor and nurse communication, cleanliness, quietness, pain control, and communication about medication. However, the three low rating hospitals performed better than the high rating hospitals on patient's understanding of their care and discharge information.

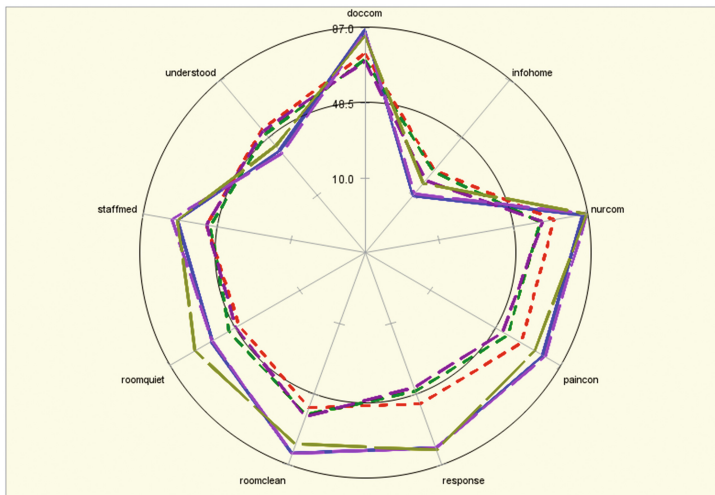


Fig. 1. Patient satisfaction dimensions for the highest rating and lowest rating hospitals. (Color figure online)

To generalize the patient satisfaction dimensions into more compact metrics, we grouped related items together according to the five dimensions of service quality: Reliability, Tangibles, Responsiveness, Assurance, and Empathy [22]. These service dimensions have been widely adopted and used in a variety of disciplines. This approach also complies with the categorization of the HCAHPS measures in the prior research [17, 27]. Three combined dimensions were generated by grouping doctor

communication and nurse communication, with equal weights, into *Communication*; cleanliness and quietness into *Environment*; and pain control and responsiveness of hospital staff into *Responsiveness*. Table 1 includes descriptive statistics for these combined measures, and Fig. 2 compares the same six hospitals from Fig. 1 using the combined metrics.

Next, we examined the effect of hospital structural factors on these three combined dimensions (Communication, Environment, and Responsiveness) using the general linear models (GLM). The results show that, across the three care quality dimensions, hospitals in rural areas are better than hospitals in divisions, with all other variables controlled (see Table 2). Teaching hospitals are lower on satisfaction level than non-teaching hospitals especially in communications ($b = -0.027$, $p < .05$) and responsiveness dimensions ($b = -0.053$, $p < .001$). Being the sole community provider is associated with lower satisfaction level on responsiveness ($b = -0.045$, $p < .05$) and room environment ($b = -0.027$, $p < .013$). Finally, hospital size has a negative effect on all the three service quality dimensions (all $ps < .01$).

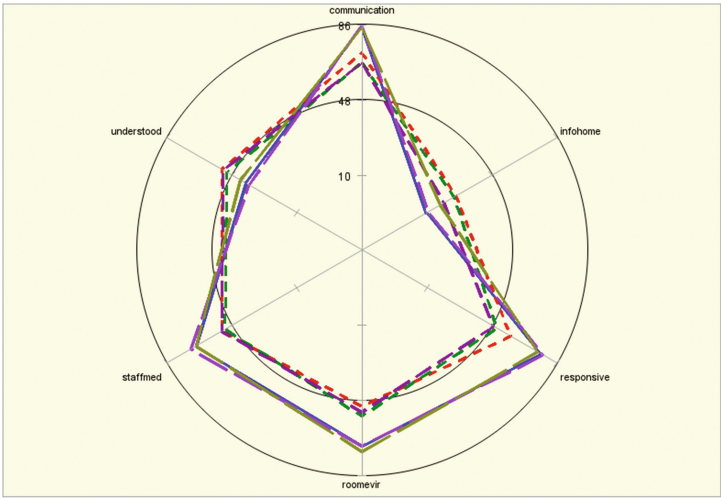


Fig. 2. Service quality dimensions for the highest rating and lowest rating hospitals.

Table 2. GLM model for Communication, Environment and Responsiveness (**bold** indicates significant values)

Parameters	Communication		Environment		Responsiveness	
	Estimates	P-value	Estimates	P-value	Estimates	P-value
Intercept	0.823	<.0001	0.689	<.0001	0.712	<.0001
Service area (Division)	-0.044	0.015	-0.055	0.024	-0.057	0.017
Service area (Metro)	-0.031	0.086	-0.067	0.006	-0.025	0.289

(continued)

Table 2. *(continued)*

Parameters	Communication		Environment		Responsiveness	
	Estimates	P-value	Estimates	P-value	Estimates	P-value
Service area (Micro)	−0.021	0.268	0.007	0.771	0.012	0.615
Residence training (MAPP3)	−0.027	0.013	−0.028	0.057	−0.053	0.000
Sole community provider (MAPP20)	−0.029	0.086	−0.059	0.010	−0.045	0.039
Total hospital beds (HOSPBD)	−0.010	0.001	−0.012	0.003	−0.015	0.001
Total hospital expense (EXPTOT, in million)	0.000	0.000	0.000	0.010	0.000	0.000

5 Discussion and Conclusions

Patient satisfaction is an important element in quality of care. With health care increasingly shifting to a patient-centered practice, understanding what patient satisfaction means and what drives it is becoming ever more important. This research takes the view that patient satisfaction has multiple dimensions that are relevant for managerial decision-making in practice. Thus, in order to provide actionable recommendations, research should focus not only on the overall patient satisfaction measures, but also on various facets of satisfaction with the care experience. By combining patient satisfaction (HCAHP) and hospital characteristics (AHA) data, our research shows that even the highest rating hospitals do not excel on all dimensions of satisfaction. While nurse and doctor communications with patients achieve high satisfaction, satisfaction levels with discharge information and explanation of medications could be significantly improved. Surprisingly, low rating hospitals are doing better than the high rating hospitals on these critical dimensions for the quality of care. Providing discharge information is essential for safe transition of care to a primary provider and successful recovery after the hospital stay. Similarly, properly communicating about medication before administration helps patients understand their care and reduces chances of medication administration errors (which can have many negative, and sometimes fatal, effects) and readmissions. One possible explanation why these measures are lower for top rating hospitals is that these dimensions of satisfaction may not always significantly impact the overall satisfaction [27]. As a result, if only the global satisfaction measures are used to incentivize hospitals (though payments for services) and compare hospitals, hospital administrators may choose to under-invest in specific care areas such as discharge information and medication communication efforts if their overall ratings are high. However, this may hide, in fact, lower levels of care, and generate opportunities for errors. Clearly, considering all satisfaction dimensions helps provide a more

accurate picture of the care received by patients and is useful in pinpointing areas where hospitals are deficient and could improve.

In addition, the analysis of the impact of hospital structural factors on different satisfaction dimensions showed that these structural factors may have differential effects. For example, the type of hospitals (e.g., teaching vs. non-teaching) has a relatively small effect on the hospital room environment than on communication and responsiveness.

In this paper, we provide an initial attempt to examine the different dimensions of patient satisfaction, investigate how hospitals differ on these multiple dimensions, and analyze the differential effects of hospital structural factors on the satisfaction dimensions. Given the richness of the data available, future research could examine the effect of additional factors (such as facility characteristics or type of disease) on different dimensions of patient satisfaction, and investigate differences in these effects across multiple U.S. states. We believe these analyses could contribute to better understanding of patient satisfaction elements and better management of the care components that affect the different satisfaction dimensions.

References

1. Aiken, L.H., et al.: Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* **344**, e1717 (2012)
2. Al-Abri, R., Al-Balushi, A.: Patient satisfaction survey as a tool towards quality improvement. *Oman Med. J.* **29**, 3–7 (2014)
3. Baldin, E., et al.: Effect of organisational features on patient satisfaction with care in Italian multiple sclerosis centres. *Eur. J. Neurol.* **23**, 307–308 (2016)
4. Bjertnaes, O.A., Sjetne, I.S., Iversen, H.H.: Overall patient satisfaction with hospitals: effects of patient-reported experiences and fulfilment of expectations. *BMJ Qual. Safety* **21**, 39–46 (2012)
5. Boulding, W., Glickman, S.W., Manary, M.P., Schulman, K.A., Staelin, R.: Relationship between patient satisfaction with inpatient care and hospital readmission within 30 days. *Am. J. Managed Care* **17**, 41–48 (2011)
6. Chen, L.M., Birkmeyer, J.D., Saint, S., Jha, A.K.: Hospitalist staffing and patient satisfaction in the national medicare population. *J. Hosp. Med.* **8**, 126–131 (2013)
7. Cheng, S.-H., Yang, M.-C., Chiang, T.-L.: Patient satisfaction with and recommendation of a hospital: Effects of interpersonal and technical aspects of hospital care. *Int. J. Qual. Health Care* **15**, 345–355 (2003)
8. Cleary, P.D., McNeil, B.J.: Patient satisfaction as an indicator of quality care. *Inquiry* **25**, 25–36 (1998)
9. Donabedian, A.: The quality of care: How can it be assessed? *J. Am. Med. Assoc.* **260**, 1743–1748 (1988)
10. Elliott, M.N., et al.: Accelerating improvement and narrowing gaps: trends in patients' experiences with hospital care reflected in HCAHPS public reporting. *Health Serv. Res.* **50**, 1850–1867 (2015)
11. Fenton, J.J., Jerant, A.F., Bertakis, K.D., Franks, P.: The cost of satisfaction: A national study of patient satisfaction, health care utilization, expenditures, and mortality. *Arch. Intern. Med.* **172**, 405–411 (2012)

12. Ghaferi, A.A., Osborne, N.H., Birkmeyer, J.D., Dimick, J.B.: Hospital characteristics associated with failure to rescue from complications after pancreatectomy. *J. Am. Coll. Surg.* **211**, 325–330 (2010)
13. Giordano, L.A., Elliott, M.N., Goldstein, E., Lehrman, W.G., Spencer, P.A.: Development, implementation, and public reporting of the HCAHPS survey. *Med. Care Res. Rev.* **67**, 27–37 (2010)
14. Hall, J.A., Dornan, M.C.: Meta-analysis of satisfaction with medical care: description of research domain and analysis of overall satisfaction levels. *Soc. Sci. Med.* **27**, 637–644 (1998)
15. Hekkert, K.D., Cihangir, S., Kleefstra, S.M., van den Berg, B., Kool, R.B.: Patient satisfaction revisited: a multilevel approach. *Soc. Sci. Med.* **69**, 68–75 (2009)
16. Hockenberry, J.M., Becker, E.R.: How do hospital nurse staffing strategies affect patient satisfaction? *ILR Rev.* **69**, 890–910 (2016)
17. Huerta, T.R., Harle, C.A., Ford, E.W., Diana, M.L., Menachemi, N.: Measuring patient satisfaction's relationship to hospital cost efficiency: can administrators make a difference? *Health Care Manage. Rev.* **41**, 56–63 (2016)
18. Lasater, M.K., Sloane, D.M., Aiken, L.H.: Hospital employment of supplemental registered nurses and patients' satisfaction with care. *J. Nurs. Adm.* **45**, 145 (2015)
19. Lehrman, W.G., et al.: Characteristics of hospitals demonstrating superior performance in patient experience and clinical process measures of care. *Med. Care Res. Rev.* **67**, 38–55 (2010)
20. Marley, K.A., Collier, D.A., Goldstein, S.M.: The role of clinical and process quality in achieving patient satisfaction in hospitals. *Decis. Sci.* **35**, 349–369 (2004)
21. Otani, K., Herrmann, P.A., Kurz, R.S.: Improving patient satisfaction in hospital care settings. *Health Serv. Manage. Res.* **24**, 163–169 (2011)
22. Parasuraman, A., Berry, L.L., Zeithaml, V.A.: Understanding measuring and improving service quality: findings from a multiphase research program. In: Brown, S.W., Gummesson, E., Edvardsson, B., Gustavsson, B. (eds.) *Service Quality: Multidisciplinary and Multinational Perspectives*, pp. 253–268. Lexington Books, Lexington (1991)
23. Reese, M.L., Campbell, D.A., Kerr Jr., B.J., Alvarez, M.R., Smith, S.P.: The economic impact of Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores for hospitals providing inpatient psychiatric services. *J. Health Care Financ.* **42**, 1–14 (2015)
24. Schoenfelder, T., Klewer, J., Kugler, J.: Determinants of patient satisfaction: a study among 39 hospitals in an in-patient setting in Germany. *Int. J. Qual. Health Care* **23**, 503–509 (2011)
25. Sequist, T.D., et al.: Quality monitoring of physicians: linking patients' experiences of care to clinical quality and outcomes. *J. Gen. Intern. Med.* **23**, 1784–1790 (2008)
26. Thompson, A.G.H., Sunoi, R.: Expectations as determinants of patient satisfaction: Concepts, theory and evidence. *Int. J. Qual. Health Care* **7**, 127–141 (1995)
27. Westbrook, K.W., Babakus, E., Grant, C.C.: Measuring patient-perceived hospital service quality: Validity and managerial usefulness of HCAHPS scales. *Health Mark. Q.* **31**, 97–114 (2014)

Smart Health

International Conference, ICSH 2017, Hong Kong,
China, June 26-27, 2017, Proceedings

Chen, H.; Zeng, D.D.; Karahanna, E.; Bardhan, I. (Eds.)

2017, XIII, 302 p. 68 illus., Softcover

ISBN: 978-3-319-67963-1