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American Journal of Medical Quality 2006; 21; 68

DOI: 10.1177/1062860605283618

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Quality Competition Among Hospitals: The Effects of Perceived Quality and Perceived Expensiveness on Health Care Consumers

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Quality of care rather than price is the main concern in health care. However, does price not matter at all? To investigate what quality and cost factors influence whether patients perceive health care services as expensive and will recommend a hospital to other patients, the authors analyzed data from a national survey of patients in Taiwan in 2002. A total of 6725 subjects returned questionnaires. Results from logistic regression models showed that (1) a patient's perception of expensiveness was determined simultaneously with the perceived quality and the out-of-pocket price of care, (2) a patient's perception of hospital quality appeared to be the most important determinant for recommending a hospital, and (3) while the out-of-pocket price did not affect a patient's recommendation, the perceived expensiveness of the ser-

vices did. The perceived value rather than the price itself is the essence of quality competition in Taiwan's health care market. (*Am J Med Qual* 2006;21:68-75)

Keywords: quality of care; price; patient perspective; health care market; Taiwan

Lack of Price Competition in the Health Care Market

Price competition is less common in the health care market than in other industries. Health care is classified as a nonperfect competitive market because of uncertainty and information asymmetry¹; it is also considered an industry that markets reputation.^{2,3} Therefore, competition for quality is more often observed in the health care market than price competition.⁴⁻⁶ A review of the literature from the 1970s and 1980s revealed that a "medical arms race" took place in the US health care market; hospitals competed for physicians and their patients by providing the most up-to-date medical equipment and excessive staffing.⁷⁻¹⁰ Quality competition has led to higher health care costs as well as a higher price for insurance coverage.

Although quality concerns dominate in health care, price may still play a role in the marketplace. Reports showed that after the implementation of the pro-competition and cost containment policies in California, the rate of increase in cost per discharge in hospitals in highly competitive markets was lower than the rate of increase in hospitals in low-competition markets.^{11,12} However, a recent study finds non-price competition becoming increasingly more common and hospitals competing to provide

AUTHORS' NOTE: The study was supported by grants from the National Science Council (NSC92-2416-H-002-044) and the National Health Research Institutes (NHRI-EX92-8801PP and NHRI-EX93-9310PI) in Taiwan. The authors are grateful to the staff in the Taiwan Bureau of National Health Insurance and its 6 branches, who helped with handling the sample list, mailing questionnaires, and making follow-up phone calls.

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American Journal of Medical Quality, Vol. 21, No. 1, Jan/Feb 2006
DOI: 10.1177/1062860605283618
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attractive services including the latest technology, excessive staffing, and lavish amenities to attract individual physicians and the patients they serve.¹³ We wondered if price matters at all.

According to consumer choice theory, when the quality of goods or services meets a consumer's expectation and when the consumer considers the price to be worth the services, then consumer satisfaction emerges and consumption of those services continues.^{14,15} However, information concerning quality and price of health care is limited. Patient selection of health care providers has been found to depend greatly on the recommendation of family members and friends,^{16,17} and a patient's experience and rating of health care quality significantly influence whether that patient will recommend a hospital.¹⁸ Patients' perceptions of the value of the services and their recommendations of providers are key features of competition in the health care market.

Taiwan's Health Care System

The health care service market has always been competitive in Taiwan. In 2002, there were 610 hospitals and 17 618 clinics for Western medicine, Chinese medicine, and dentistry, serving about 23 million people in Taiwan. The National Health Insurance (NHI) program, implemented in 1995, now covers more than 96% of all citizens in Taiwan and has contracts with 95% of the nation's hospitals. When it was implemented, competition became more intense. Small-scale hospitals were driven out of the market, and the expansion of hospital scale is obvious.¹⁹ Detailed descriptions of the implementation and influence of the nationwide health insurance program are available elsewhere.²⁰⁻²²

A hospital accreditation system has been implemented since 1978 and classifies hospitals into 3 categories in descending order: medical center, regional hospital, and district hospital.²³ As of 2002, of the nation's 610 hospitals, 23 were medical centers, 71 were regional hospitals, 41 were district teaching hospitals, 344 were district hospitals, and 131 were non-accredited hospitals. Hospitals without teaching accreditation were mostly small-sized, privately owned hospitals with fewer than 100 beds.

Despite universal coverage under Taiwan's NHI system, price variation still exists. Because the Bureau of the National Health Insurance (BNHI) is the only purchaser of health care services, it establishes payment schemes for various kinds of services for all contracted providers. NHI beneficiaries are required

to make a copayment of 10% of their hospitalization expenses with an upper limit of NT \$24 000 (US \$700) per admission, while patients with a low-income certificate are exempted from the copayment requirement. Hospitals can also charge patients directly for services or medical materials not covered by NHI. For example, there is an extra fee for a stay in single- or double-bed wards because NHI will pay only for stays in wards with a minimum of 3 beds. Usually, patients were not aware of the exact amount they paid for the copayment requirement or the extra fee charged.

Without a formal referral requirement or a family physician system, people in Taiwan are free to choose any of the NHI-contracted hospitals to receive ambulatory or inpatient services. Virtually the only available information a prospective patient or his or her family members have on which to base their choice is a hospital's reputation (ie, which hospitals people recommend) and bed size.¹⁷ This study investigates out-of-pocket hospital charges and patients' perceived quality of care and their influence on hospital choice.

MATERIALS AND METHODS

Sources of Subjects

A nationwide survey of discharged patients was conducted to gather information about patients' ratings of hospital performance and about the items or services used and the out-of-pocket charges incurred. Because the diagnostic and treatment procedures as well as the medical expenses might vary significantly among different diseases, we surveyed only patients with certain diagnoses and procedures. After consulting medical professionals and considering the prevalence of the diagnoses for case collection, we chose to survey discharged patients who had 1 of 4 medical diagnoses (ie, stroke, asthma, pneumonia, diabetes mellitus) or 1 of 2 surgical procedures (ie, cesarean section, appendectomy). To obtain administrative efficiency, this survey included only patients discharged from hospitals designated as district teaching hospitals or higher because the large number of small-scale hospitals provides only a small portion (less than 10%) of inpatient services nationwide.

Sample selection was conducted with the help of the BNHI. All of the NHI-contracted hospitals file monthly claims to 1 of the 6 regional NHI branches. The branch offices listed patients with the above-mentioned major diagnoses discharged from hospitals accredited as district teaching hospitals or higher

between January 1, 2002, and March 31, 2002. These lists made up our potential candidates. Patients who expired during their hospital stay and patients with more than 1 diagnosis from the 6 disease categories were excluded. A systematic random sampling was conducted to select 50% of the listed patients from each hospital per month with an upper limit of 15 patients per diagnosis. Questionnaires were then mailed to the study patients between 2 and 3 months after discharge. At least 3 telephone calls were made by the employees in the 6 BNHI branches to encourage participants who had not returned their questionnaires to do so.

Questionnaire Design

A structured questionnaire was designed to gather information on the price and perceived quality of hospital care, and the items covered such areas as out-of-pocket charges, type of ward, length of stay, and the medical and nursing care experience. The questionnaire was first standardized via a small-scale pilot test on 60 discharged patients. Sampled patients or their primary family caregivers were asked to answer the questionnaire. The questionnaire began with questions to identify the patient's diagnosis and the respondent.

Questions about quality of hospital care usually address many different dimensions.²⁴⁻²⁶ After reviewing measurement tools developed by previous researchers and considering our previous experience,¹⁸ we selected 10 items to measure 2 major dimensions of quality of care: clinical competence and the interpersonal skills of the medical staff. Clinical competence was addressed with 5 questions: hospital equipment, physician's competence, nurse's competence, explanation of treatment, and outcome or recovery status. Interpersonal skills also were addressed with 5 questions: physician's attitude, physician's respect, nurse's attitude, nurse's response, and nurse's communication.

Each of the 10 questions was designed to have 5-level response categories such as *definitely enough* to *obviously insufficient*, *very good* to *very poor*, or *much better than expected* to *much worse than expected*. Scores ranging from 5 to 1 were assigned to the 5 response categories. The total possible score for each dimension (clinical competence and interpersonal skills) ranged from 25 to 5. Higher scores represented better perceived quality of hospital performance. Missing values in each of the 10 items (from 0.5% to 5.1% of the total number of people surveyed in each

category) were replaced by the mean scores for each of the diagnoses to maximize the amount of useful information. Patients with different conditions were analyzed separately as suggested by Hargraves et al to account for possible clinical variations.²⁷

There was 1 question about whether a patient would recommend the hospital: "If someone asks you about that hospital, would you recommend it?" The 5 response categories for this question were *strongly recommend* to *definitely not recommend*. In a logistic regression model, the first 2 responses (*strongly recommend* and *recommend*) were defined as 1 group and the remaining responses as the other. In this study, we assumed that hospitals with better perceived quality or more reasonable price were more likely to be recommended by their patients.

Statistical Analysis

The means and standard deviations of continuous variables are presented in the description section; some of these variables are presented in ordered categories as needed. Variables measuring out-of-pocket payment, family income, length of stay, and interpersonal and technical skill ratings were categorized into 3 levels using the first and the third quartiles as cut-off points. A multiple logistic regression model was used to examine the effect of patients' ratings of quality and out-of-pocket payments on their perception of expensiveness. A second logistic regression model was constructed to investigate the effect of perceived expensiveness, out-of-pocket charges, and quality rating on patients' hospital recommendations. Odds ratios and 95% confidence intervals, as well as the significance levels based on χ^2 tests, were presented to compare the magnitudes of the effects. The analyses were performed using SAS system version 8.0.

RESULTS

Characteristics of the Sample

A total of 17 798 questionnaires were mailed out. After deleting those that had been sent to the wrong address and those mailed to patients who had died since discharge, there were 14 408 valid questionnaires. A total of 6725 completed questionnaires were returned to us, for an overall response rate of 46.7%. Patients who had undergone either of the 2 surgical procedures possessed characteristics different from those affected by the 4 medical conditions: they had

Table 1
Basic Information of Discharged Patients by the 4 Medical Conditions

Item	Diabetes	Pneumonia	Stroke	Asthma	Total
n	1055	1518	964	955	4492
Gender, % female	51.0	41.7	40.0	46.6	44.5
Age, $\bar{x} \pm SD$	61.0 $\pm$ 16.6	40.1 $\pm$ 31.0	68.4 $\pm$ 11.8	41.6 $\pm$ 29.7	51.4 $\pm$ 27.4
Family income, $\bar{x} \pm SD$	35872 $\pm$ 30537	45763 $\pm$ 33605	37112 $\pm$ 31324	43276 $\pm$ 29884	40996 $\pm$ 31904
Length of stay, $\bar{x} \pm SD$	9.8 $\pm$ 8.0	7.5 $\pm$ 5.6	11.5 $\pm$ 9.4	7.2 $\pm$ 5.7	8.8 $\pm$ 7.4
Interpersonal skill, $\bar{x} \pm SD$	19.8 $\pm$ 3.0	20.0 $\pm$ 2.8	19.8 $\pm$ 2.9	20.1 $\pm$ 2.9	19.9 $\pm$ 2.9
Technical skill, $\bar{x} \pm SD$	19.2 $\pm$ 3.3	19.2 $\pm$ 3.1	19.1 $\pm$ 3.2	19.2 $\pm$ 3.2	19.2 $\pm$ 3.2
Out-of-pocket cost, $\bar{x} \pm SD$	7004 $\pm$ 5189	5323 $\pm$ 4848	6169 $\pm$ 5602	4889 $\pm$ 4603	5572 $\pm$ 5072
Perceived expensiveness, %					
Very expensive/expensive	23.5	23.3	20.0	23.8	22.7
Reasonable	55.0	58.2	59.0	55.3	57.0
Cheap/very cheap	4.4	5.6	6.2	6.2	5.6
No answer	17.2	12.9	14.7	14.8	14.7
Hospital accreditation level, %					
Medical center	18.9	15.6	23.3	21.0	19.2
Regional hospital	63.3	59.1	60.3	58.5	60.2
District teaching hospital	17.8	25.4	16.4	20.6	20.6
Hospital ward, %					
Single-bed room	8.9	14.3	10.0	11.8	11.6
Double-bed room	36.0	37.5	41.2	36.3	37.7
Insurance room	55.2	48.2	48.8	51.9	50.8
Recommend the hospital, %					
Strongly recommend/recommend	48.2	45.0	48.0	44.3	46.2
Conservatively recommend/not recommend	38.9	44.2	40.7	43.9	42.1
No answer	13.0	10.8	11.3	11.8	11.6
Self-answer, %	38.0	34.3	23.9	36.6	33.4

significantly shorter hospital stays and higher perceived quality of care due to relatively "curable" conditions, and the cesarean section patients were women of a narrow age range. Furthermore, health care for these 2 procedures was reimbursed by NHI's case payment scheme rather than a common fee-for-service method, which might influence a hospital's charging behavior significantly. To simplify the analysis of price, perceived expensiveness, and recommendation, this study included only patients diagnosed with 1 of the 4 medical conditions ($n = 4492$).

Basic survey information about the respondents is shown in Table 1. Men dominated 3 of the 4 disease categories (all but diabetes). Stroke patients were the oldest group, with a mean age of 68 years. Patients with pneumonia and asthma were much younger and had mean ages of about 41 years. The overall family income was about NT \$41000 per month. The average length of stay was 8.8 days, with stroke patients having the longest stays (11.5 days). Patients with these 4 medical conditions did not vary notably in their perception of a hospital's quality of care, technical capabilities, or interpersonal skills.

Patients were discharged from medical centers, regional hospitals, and district teaching hospitals with ratios of about 2:6:2, respectively. The distribution of medical diagnoses of the patients discharged from these hospitals varies to some extent from hospital to hospital. Approximately 50.8% of the patients stayed in insurance-paid wards throughout their hospital stay, so they did not need to pay for extra ward fees. On the other hand, 11.6% of the patients stayed in single-bed rooms, and 37.7% of the patients stayed in double-bed rooms and were charged various extra ward fees by the individual hospitals.

The overall average out-of-pocket charge was about NT \$5500, with patients with diabetes paying the highest charge (about NT \$7000). A total of 22.7% of the patients felt that the out-of-pocket charges were very expensive or expensive, while 55.7% of the respondents reported that the charges were reasonable. A certain portion of the patients (14.7%) did not answer the question concerning perceived expensiveness; these respondents tended to be older and to have lower family income. About 46.2% of the patients reported that they would (strongly) recom-

mend the hospital, while 11.6% of the respondents did not answer the recommendation question. Only 33.4% of the patients answered the questionnaires themselves.

Out-of-Pocket Price, Perceived Expensiveness, and Recommendation

Simple associations of patients' perceived expensiveness, hospital recommendation, and related factors are shown in Table 2. Of the respondents, 62.6% considered the out-of-pocket charges to be reasonable, cheap, or very cheap; 37.4% considered them expensive. People who incurred out-of-pocket charges greater than NT \$6300 or with family incomes of less than NT \$23 000 per month were more likely to report that the charges were expensive (49.8% and 40.9%, respectively). Patients with higher scores of perceived quality (ie, interpersonal or technical skill ratings) were less likely to report that the charges were expensive. Patients who had been discharged from a public hospital or had been staying in an insurance ward were more likely to report that the charges were reasonable (67.0% and 69.1%, respectively).

The last column of Table 2 shows the association between patients' hospital recommendations and related factors. On average, 46.2% of all the respondents reported that they would recommend the hospital they chose. Patients who reported the charges as expensive were less likely to recommend their hospitals than were those who reported the charges as reasonable (32.7% vs 54.3%). The out-of-pocket price, on the other hand, was not associated with the likelihood of recommending a hospital. Patients' perceived quality of hospital care was significantly associated with their recommendations of the hospital. Hospitals with higher accreditation levels were more likely to be recommended: medical centers (58.0%), regional hospitals (45.7%), and district teaching hospitals (36.8%). Hospital ownership was also related to a patient's recommendation, with privately owned hospitals being the least recommended (39.0%).

Results of the Logistic Regression Models

Two sets of logistic regression models were conducted to examine the effects of out-of-pocket charges and other related factors on patients' perception of expensiveness and their hospital recommendations, as seen in Table 3. The amount of out-of-pocket charges appeared to be a positive predictor for perceived ex-

Table 2
Patients' Perceived Expensiveness and Hospital Recommendations by Associated Factors

	Perceived Expensiveness, %	Recommend the Hospital, %
Total	37.4	46.2
Perceived expensiveness		
Expensive	—	32.7*
Reasonable	—	54.3
Out-of-pocket cost, NT\$		
>6300	49.8*	47.2
2300-6300	36.2	44.8
<2300	26.4	46.7
Family income, NT\$		
>60 000	32.9 [†]	51.7 [‡]
23 000-60 000	36.8	47.1
<23 000	40.9	45.3
Interpersonal skill		
High	25.6*	65.7*
Medium	35.4	41.0
Low	50.5	16.3
Technical skill		
High	28.9*	74.0*
Medium	38.4	45.5
Low	52.8	20.9
Hospital ward		
Single-bed room	40.2*	49.2 [‡]
Double-bed room	44.8	48.0
Insurance room	30.9	44.5
Hospital accreditation		
Medical center	41.0 [‡]	58.0*
Regional hospital	37.1	45.7
District teaching hospital	35.2	36.8
Hospital ownership		
Public hospital	33.0	48.8
Nonprofit hospital	39.0	47.7
Private hospital	41.5	39.0

* $P < .001$ by χ^2 tests for the distribution of perceived expensiveness and recommending the hospital among the categories of individual associated variables.

[†] $P < .01$.

[‡] $P < .05$.

pensiveness (odds ratio [OR] = 1.07), while technical capability and interpersonal skill ratings tended to be negative determinants of perceived expensiveness (ORs = 0.87 and 0.95). Other factors such as family income, disease category, ward type, hospital accreditation level, and hospital ownership also were significantly associated with perceived expensiveness.

The right columns of Table 3 show the results of patients' hospital recommendations. Perceived expensiveness tended to be a significant predictor of patients' hospital recommendations (OR = 0.56), while the amount of out-of-pocket cost showed no effect at all (OR = 1.00 [0.98, 1.02]). We also examined

Table 3
Determinants of Patients' Perceived Expensiveness and Hospital Recommendations
From Logistic Regression Models (N = 3916)

Variable	Perceived Expensiveness		Recommendation	
	OR	95% CI	OR	95% CI
Perceived expensiveness (reference: reasonable)				
Expensive	—	—	0.56*	0.48-0.67
Out-of-pocket cost	1.07*	1.05-1.09	1.00	0.98-1.02
Interpersonal skill [†]	0.95 [‡]	0.92-0.99	1.17*	1.13-1.22
Technical skill [†]	0.87*	0.84-0.90	1.32*	1.27-1.37
Hospital accreditation level (reference: district hospital)				
Medical center	1.53*	1.20-1.96	1.93*	1.49-2.50
Regional hospital	1.12	0.92-1.35	1.41 [‡]	1.16-1.72
Hospital ownership (reference: private hospital)				
Public	0.61*	0.50-0.76	1.15	0.92-1.44
Nonprofit	0.85	0.70-1.05	1.06	0.85-1.32
Age, y (reference: ≥51)				
≤35	1.07	0.86-1.32	0.77	0.61-0.97
36-50	1.04	0.86-1.26	0.87	0.71-1.07
Family income, NT\$ (reference: <23 000)				
>60 000	0.68 [‡]	0.54-0.87	0.90	0.70-1.16
23 000-60 000	0.83 [§]	0.69-0.99	0.91	0.75-1.09
Hospital ward (reference: insurance room)				
Single-bed room	1.34 [§]	1.05-1.71	1.23	0.95-1.59
Double-bed room	1.61*	1.37-1.89	1.09	0.92-1.30
Conditions (reference: asthma)				
Diabetes	0.99	0.81-1.22	1.23	0.98-1.54
Pneumonia	0.94	0.78-1.14	1.05	0.86-1.29
Stroke	0.67*	0.54-0.84	1.34	1.06-1.69
Self-answer	1.14	0.97-1.35	1.02	0.85-1.21

Results from logistic regression models presenting odds ratios (ORs) and 95% confidence intervals (CIs) for comparison. Dependent variables were perceived expensiveness = 1, perceived reasonableness and no answer = 0, and strongly recommend and recommend = 1, recommend with reservation, not recommend, and no answer = 0.

**P* .001.

[†]Missing values to the interpersonal or technical skills variables were replaced by subgroup mean values.

[‡]*P* .01.

[§]*P* .05.

the possibility of collinearity by removing “perceived expensiveness” from the regression model; the out-of-pocket cost still showed no significant effect (OR = 0.99 [0.98, 1.01], and the correlation coefficient was 0.20, *P* < .001). On the other hand, interpersonal and technical ratings, representing perceived quality of care, appeared to be influential determinants of a patient's hospital recommendation, with ORs of 1.17 (1.13-1.22) and 1.32 (1.27-1.37), respectively.

DISCUSSION AND CONCLUSION

Results from this study show that perceived quality of hospital care remains the key feature in the competitive health care market under Taiwan's universal health insurance scheme, and a patient's perception of the quality of that care appears to be the

most important determinant for his or her recommendation of the hospital. The patients' rating of the technical capability and performance of the hospital tended to be more influential than the interpersonal and communication skill ratings, possibly indicating the relative importance of the 2 dimensions from their perspective. This finding explains the expansion of hospital scale in Taiwan, which is similar to the “medical arms race” phenomenon in the United States. Furthermore, under the NHI in Taiwan, people are free to choose among providers, and former patients' hospital recommendations are one of the key sources of information that consumers use to select among hospitals. The association of perceived quality and recommendation echoes previous reports concerning the quality competition in the health care market.^{5,18}

Given that quality is the main concern of consumers in the health care market, does price matter at all? This study examined the effect of price on recommendation in 2 ways: an absolute value of the out-of-pocket cost and the perceived expensiveness of the cost versus the services provided in the hospital. Our results showed that the out-of-pocket cost was a significant predictor for perceived expensiveness. Not surprisingly, however, the perceived quality of care appeared to be an important determinant for perceived expensiveness as well. Patients who perceived good quality of care were more likely to report that the cost was reasonable. This finding shows that perceived expensiveness is determined simultaneously with perceived quality of care and the out-of-pocket cost of that care, which forms the perceived value of the services. A patient is more likely to recommend a hospital if he or she perceives a higher value (ie, high rating of quality and/or low cost), which concurs with the marketing theories.²⁸

Interestingly, perceived expensiveness was negatively associated with a patient's recommendation of the hospital, but out-of-pocket cost did not affect the recommendation. One of the possible explanations of this is that the out-of-pocket cost, with an average of NT \$5572 or US \$170, was not "very expensive" in Taiwan (with a GDP of US \$13 500 in 2004).²⁹ However, the finding also reveals that the absolute amount of price may affect a patient's hospital recommendation only when a patient perceives the hospital to be expensive, meaning that he or she does not believe the service is worth the price. In terms of methodological thinking, we consider that perceived expensiveness is the intervening variable between price paid and recommendation. Given a certain level of perceived quality, low out-of-pocket cost leads to nonexpensive feeling and a high price results in expensive feeling. The perceived expensiveness then may influence the patient's recommendation of a hospital. Thus, a hospital, such as a large-scale medical center that can provide quality care and charge higher prices, may also enjoy popular recommendation by patients.

Knowing that health care service is not a homogeneous product, we believe that perceived value rather than the price is the essence of quality competition in the health care market. However, given its unique value, the validity of having patients evaluate medical performance as a quality measure needs to be further investigated. This study included patients with only certain medical diagnoses; the sample consisted of fewer elderly and low-income subjects. Analysis of

a sample with a more comprehensive case mix or involving multiple health plans is suggested for future study.

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