Patient perceptions of service quality in group versus solo practice clinics

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Abstract

Objective. To compare patient perceptions of service quality at solo and group practices, and to examine the association of perceptions with 'potential patient loyalty' (PPL), the potential for seeking future service from the same clinic.

Design. A self-administered, cross-sectional survey of clinic outpatients, using an adapted SERVQUAL questionnaire translated into Chinese, with additional items on overall satisfaction and intent to return/recommend the clinic to others.

Sampling and study subjects. Every third outpatient at all newly started group practices (four) and solo clinics (thirteen) in Taiwan in the preceding 4–7 months, including 150 and 50 patients from each group and solo practice, respectively, for a total of 1250 patients.

Main outcome measures. Perceived service quality on five dimensions—tangibles, reliability, responsiveness, assurance, and empathy—and PPL. All constructs were measured on a five-point scale.

Results. After accounting for random effects of clinical and geographical location, group practice patients perceived significantly higher service quality on all dimensions relative to solo practice patients, after adjusting for age, gender, education, and illness type. All service quality dimensions except assurance were significantly positively associated with PPL after adjusting for age, gender, education, and illness type, and random effects at the clinical and geographical location levels.

Conclusions. Patients perceive better service quality at group practices compared with solo practices on all dimensions. Patients' quality perceptions are significant predictors of PPL. The implications for physician practices both internationally and in Taiwan are discussed, as well as policy implications for the Taiwan government.

Keywords: group practice, patient satisfaction, potential patient loyalty, service quality

Health care quality has two distinct facets: technical quality (also called quality in fact) and functional quality [1,2]. Technical quality refers to the accuracy of medical diagnoses and procedures, and is generally comprehensible to the professional community, but not to patients [3]. Patients essentially perceive functional quality as the manner in which the service is delivered [1,4]. Functional quality perceptions may influence future decisions to return to a facility for service. Some empirical evidence suggests that patients' quality judgment may be positively associated with technical quality, as reflected in outcomes such as risk-adjusted mortality among hospitalized patients for medical conditions [5].

Apart from its potential association with health outcomes, responsiveness to patient expectations is valuable both as a marketing tool and as an intrinsically valued goal. In 2000, the World Health Organization identified responsiveness to patient expectations as a key measure of health system performance to achieve better health outcomes, since satisfied patients are more likely to utilize needed services. There is no documentation on the factors associated with service quality, except that countries scoring high on responsiveness have a preponderance of private health care institutions.

Taiwan's health system relies heavily on the private sector, although the government pays for all care through National Health Insurance (NHI), instituted in 1995 to cover all citizens. Consumer perceptions of service quality at office-based practices have strategic implications for health care costs in the wake of a marked shift in outpatient encounters away from office-based practices towards high-cost hospital outpatient departments, even for primary health care needs, following NHI.

Escalating outpatient care costs have prompted the Department of Health (DOH) to explore cost-cutting measures, including policies to reverse patient preferences for hospital outpatient departments. The DOH sees the group practice model as a cost-effective primary care setting for outpatients, with administrative and financial economies of scale relative to solo practices, and with a greater capacity to handle Bureau of the NHI (the administrative body that administers

437

the NHI program) claims, reporting, quality assurance, and accreditation processes [6]. The DOH has encouraged group practice formation through grants for research and sponsoring physician seminars on office-based practice.

Current profile of group practices

Group practice has gained ground in many countries [7]. One-third of US physicians are in group practices, and 91.5% of family physicians in UK are in partnerships [8]. In Taiwan, the group practice model is rapidly gaining ground, up from 2.6% of office-based clinics in 2000 to 29% in 2002, mostly with two to five physicians [9,10]. Of these, 67.6% were single-specialty, and 32.4% multi-specialty practices, based on partnership, contractual, or salaried relationships [10]. NHI requirements of complex documentation processes for reimbursement and quality assurance have progressively eroded solo practitioners' consulting hours and incomes, inducing them to choose employment in group practices or hospitals over entrepreneurship. Despite these general trends, however, many office-based physicians hesitate to join a group practice or expand an existing partnership, due to lack of empirical evidence of exceptional clinical and/or business advantage over the solo practice model.

Group versus solo practice performance

Empirical evidence in the US shows that the group practice model produced superior outcomes in terms of productivity, efficiency, malpractice risk, and provider incomes [11–13]. From a professional and service perspective, physicians in group practices are better positioned to offer a range of medical services, share fixed costs, exchange clinical opinions, and have better quality of life due to shared responsibility for call duties, local health market power, and better access to capital [14,15]. Very little research exists on health care quality in group versus solo practices. High quality of medical care, both technical and functional, is integral to the health system's performance and, at the institutional level, an essential strategy for survival in the competitive health care environment.

This study explored patient perceptions of medical service quality provided by solo and group practices. We hypothesized that the superior resource base of group practices would translate into better customer service. Further, since patient perceptions are likely to influence future decisions to avail the clinic's services, a construct of potential patient loyalty (PPL) is postulated, comprising global satisfaction with the clinic, and behavioral intent to return to the clinic and recommend it to friends and relatives. We also examined the association of perceived service quality with potential loyalty, to test the predictive validity of quality perceptions for intent to return to the provider. Our findings have policy implications for governments, and management implications for office-based physicians.

Methods

The study covered all group and solo practices newly established from March to June 2003 (four and 13, respectively).

Individual outpatients attending these clinics during November 2003 served as the observation units. Since a clinic's tenure could affect its reputation and customer perceptions, we purposely selected newly established clinics.

Every third outpatient who had visited the clinic at least once before the current visit was requested to respond to the self-administered survey on-site, beginning on 1 November 2003, until 150 patients and 50 patients were covered at group practices and solo clinics, respectively (over 3–8 business days) for a total of 1250 patients. For pediatric patients (<14 years), the accompanying parent was surveyed. Patients were assured full confidentiality and anonymity, and requested to complete the survey while waiting for drugs after completing the doctor's consultation. The survey had a 100% response rate.

Survey instrument

The survey comprised three parts: perceived service quality items adapted from the SERVQUAL survey developed by Parasuraman *et al.* [16], additional questions tapping into PPL for future visits, and demographic information. SERVQUAL was designed to measure consumers' quality perceptions about services using 22 items representing five distinct dimensions. These were tangibles (physical facilities, equipment and appearance of personnel, four items), reliability (dependability with respect to timeliness and accuracy, five items), responsiveness (willingness to help customers and prompt service, four items), assurance (courtesy and inspiring trust and confidence, four items), and empathy (individualized consideration for patient's welfare, five items). The score on each dimension is the mean of the sum of the corresponding item scores. Internationally, the SERVQUAL survey has been used extensively in banking, fast food, libraries, and the health care industry to measure service quality [17–19]. Its validity and reliability for health care settings are established [20–22], and its utility for quality improvement in a clinic setting is also documented [22,23].

SERVQUAL, in its original format, measures the service quality gap between client expectations and perceptions of 22 quality attributes (on a seven-point scale: strongly disagree = 1 to strongly agree = 7), asking the same questions in two formats: (i) the extent to which the firm XYZ offering the service should possess the feature (e.g. 'They should have up-to-date equipment'); and (ii) the extent to which the consumer believes it to be present (e.g. 'XYZ has up-to-date equipment'). In adapting the instrument, we accommodated the following concerns. Firstly, patients might abandon the survey or complete it indifferently if they received their drugs before survey completion. Secondly, the voluminous mandarin script required us to re-evaluate the need for two sets of questions, essentially bearing the same content. Apart from sheer reading volume, respondent fatigue, distraction, or agreement bias could set in [24], with seemingly repetitive questions, in addition to confusing respondents at a lower reading level. These issues would cause indeterminate respondent bias. We also noted that most of the empirical literature questions the utility of patient expectations data [20,22]. Therefore, we worded the questions to tap directly

into respondents' perceptions net of expectations, using a five-point response scale (very low/little = 1 to very high/much = 5). Responding that the clinic is 'low' on up-to-date equipment implies that relative to the respondent's expectations, it is low (Table 2). Therefore, our response set is designed to capture the respondent's perception of the service quality of the clinic net of his/her expectation of what it should be.

The second part of our survey tapped into PPL. This construct, reflecting the potential for return-to-the-clinic, is conceptualized as the aggregate of cognitive satisfaction and behavioral intent to seek future services for self or significant others from the same clinic. PPL score is the mean of the sum of three item scores: global satisfaction with the encounter, willingness to return to the clinic in future, and willingness to recommend it to others (on a five-point scale, from very low/little to very high/much). These items have been used singly or in various combinations in previous studies [20,22]. The third part of the survey concerned demographic information on patient's age, gender, education, marital status, and type of illness. For type of illness, the patient had to select from a list of specialties.

The adapted and translated survey was assessed for content validity and wording by seven experts (two physicians each in solo and group practices, and three health services research experts), and was pilot-tested on 30 outpatients across six clinics, yielding high Cronbach's alpha for all five dimensions. Pilot responses were used to fine-tune the survey for clarity and wording.

Study hypotheses

Hypothesis 1. Patients attending group practices will perceive higher service quality compared with solo clinics.
Hypothesis 2. Higher service quality will be positively associated with global satisfaction with the encounter and PPL.

Data analysis

Data were entered in Excel and analyzed in SAS, using hierarchical linear regression modeling to account for data clustering within locations (i.e. regions) and clinics. We introduced a random effect at each level of clustering to partition out unmeasured variation associated with clinic-specific and region-specific factors. The random effects were assumed to be normally distributed and centered at zero. The SAS Proc Mixed procedure was used for all regression analyses. The study hypotheses were tested, controlling for age, gender, education, marital status, and type of illness, since the existing literature suggests that age, gender, and medical condition are significantly associated with service quality perception and/or patient satisfaction [25].

Results

Cronbach's alphas across the total sample for tangibles, reliability, responsiveness, assurance, empathy, and PPL were 0.88, 0.89, 0.88, 0.90, 0.92, and 0.88, respectively. Group and solo practice respondents differed significantly with respect to age, education, marital status, geographic location, and type of illness (Table 1).

Service quality perceptions and patient satisfaction

Table 2 shows the mean responses to items and scales by clinic type. All item and scale scores were significantly higher for group practices ($P < 0.001$). Table 3 shows that, adjusted for age, gender, education level, marital status, and type of illness, perceived quality was significantly higher at group practices for all five dimensions: tangibles, reliability, responsiveness, assurance, and empathy ($P < 0.05$). Group practice patients scored, on average, 0.25 to 0.31 higher than solo practice patients. Increasing age was positively associated with higher quality scores. Gender, marital status, and education were not significant. Type of illness was also not associated with service quality, except for marginally significant lower scores among patients with orthopedic complaints.

To investigate the appropriateness of random effects modeling for this dataset and these models, we examined Akaike's Information Criterion (AIC) for the models having no random effects [26], and for those with the effects included (statistics not shown). The AIC is a log likelihood value that is adjusted for the number of model parameters. AIC values from various statistical models are commonly compared to judge how well the models fit the observed data. In our analyses, the AIC comparisons favored the random effect models. We also conducted restricted likelihood ratio tests (statistics not shown), which indicated that the random effect models provided notably better fits to the data ($P < 0.001$). The random effect models fit a separate intercept for each clinic and location. These effects are introduced to account for factors that are otherwise unmeasured in the models, such as the effects of particular physicians or neighborhoods. Including these effects also provides appropriately conservative standard errors for data such as these, in which observations from within each location and clinic are correlated. The numbers presented for the random effects are estimates of the variance of the separately estimated intercepts for each clinic (or location) around the mean of those intercepts. These variance estimates are not of great interest in themselves for the purpose of this analysis, however. As such, they are included in the models primarily to improve the estimates and standard errors of the covariates of interest with respect to systematic sources of variation within each cluster of patients (at a clinic or location).

Perceived service quality and PPL

Crude correlations between service quality and PPL ranged between 0.47 and 0.55 ($P < 0.001$). Table 4 shows the estimates for two hierarchical models predicting PPL, both including random effects for clinic and location. The model without service quality variables shows practice type being a significant predictor of PPL, but once the service quality variables are added, practice type is no longer significant, and all service quality dimensions except assurance are significant. A unit increase in the reliability score is associated with a 0.25 unit increase in PPL score, followed by responsiveness 0.22, empathy 0.18, and tangibles 0.12. Among illness types, obstetrics and gynecology, orthopedic, and rehabilitation-related illness are

Table 1 Respondent's socio-demographic characteristics according to clinic type

Variable	Clinic type		P-value
	Solo practice, *n* (%)	Group practice, *n* (%)	
Total	650 (100)	600 (100)	
Age (years)			<0.001
18–30	241 (37.1)	148 (24.7)	
31–50	309 (47.5)	267 (44.5)	
51–65	75 (11.5)	114 (19.0)	
≥66	25 (3.8)	71 (11.8)	
Gender			0.317
Male	250 (38.5)	243 (40.5)	
Female	400 (61.5)	357 (59.5)	
Highest educational level			0.002
Elementary/junior high school	133 (19.5)	157 (27.6)	
Senior high school	240 (35.2)	188 (33.1)	
Some college and above	309 (45.3)	223 (39.3)	
Marital status			<0.001
Married	407 (62.6)	439 (73.2)	
Single[1]	243 (37.4)	161 (26.8)	
Type of (specialty related to) illness[2]			0.007
Internal medicine	207 (31.8)	191 (31.8)	
Obstetrics and gynecology	71 (10.9)	71 (11.8)	
Pediatrics	77 (11.8)	53 (8.8)	
Family medicine	50 (7.7)	35 (5.8)	
Otorhinolaryngology	56 (8.6)	29 (4.8)	
Orthopedics	37 (5.7)	52 (8.7)	
Dermatology	101 (15.5)	94 (15.7)	
Rehabilitation	62 (9.5)	88 (14.7)	
Multiple problems	51 (7.9)	60 (10.0)	

[1]Includes never married, widowed, divorced, and separated.
[2]Patients may visit a specialist (such as pediatrician) for general health problems, or a specialty other than the condition suggests (e.g. a patient with a skin ailment may visit her obstetrician or internist).

significantly and highly associated with PPL after adjusting for service quality, which is expected since these patient categories are most likely to need repeat visits for subsequent care.

Discussion

This study compared patient perceptions of service quality at group and solo practices, and examined the relationship between service quality and PPL, comprising cognitive satisfaction and behavioral intent to return/recommend the clinic to others. Group practice patients score significantly higher than solo practice patients on the tangibles, reliability, responsiveness, assurance, and empathy dimensions of service quality and also on PPL, which, in turn, is well predicted by quality perception scores. Our findings are consistent with the literature showing that quality perceptions drive health care institution selection [27] and whether it is recommended to others [28,29].

We used a modified SERVQUAL instrument that was substantially different to the original format, tapping into the quality gap between patient expectations and perceptions of actual service quality [20–22,25,30]. However, patient expectations data fail to make a substantive research contribution beyond what is accounted for by the perception scores [20]. Our response set on perceptions (very low/little to very high/much) appears to subsume the expectations element, and represents the patient's perception net of expectations. The instrument is reliable as shown by high Cronbach's alpha values for all dimensions (>0.85), and high criterion-related validity for a behavioral variable, PPL.

Our study documents the comparative superiority of group practices on quality perceptions and PPL, after controlling for respondents' age, gender, education, type of illness, and systematic effects of clinic-wise and small area (geographic) variations. Income was excluded due to collinearity with education, because NHI reimbursement to providers is independent of patient's income, and because co-payments are low and uniform across all patients. Only newly opened clinics were included, eliminating potential bias from heterogeneous sample composition. We also found that service quality perceptions have a significant association with future propensity to return to the clinic.

Table 2 Perceived quality of service and potential patient loyalty by clinic type: means of the item and scale scores

Item/scale	Clinic type			
	Solo practice		Group practice	
	Mean[1]	SD	Mean[1]	SD
Tangibles				
1. Have up-to-date equipment	3.72	0.70	4.00	0.71
2. Physical facilities are visually appealing	3.74	0.67	3.96	0.70
3. Employees are well dressed and appear neat	3.87	0.68	4.09	0.69
4. Appropriate physical facilities for type of services	3.71	0.68	3.92	0.76
Mean score on tangibles	3.73	0.57	4.01	0.60
Reliability				
5. Inform patients precisely when services will be performed	4.01	0.74	4.19	0.74
6. Staff can be depended upon to do the right things	3.97	0.72	4.13	0.70
7. Sincerity of clinic staff to try to solve patient problems	3.92	0.73	4.08	0.71
8. Waiting time relative to appointment time or scheduled time for a service	3.60	0.80	3.74	0.84
9. Keep accurate medical records	3.74	0.74	3.93	0.74
Mean score on reliability	3.80	0.60	4.05	0.62
Responsiveness				
10. Maintain smooth flow of patients	3.78	0.67	4.03	0.72
11. Receive prompt service from clinic staff	3.90	0.66	4.11	0.71
12. Staff are always willing to help patients	3.94	0.65	4.20	0.70
13. Prompt response to patient requests and problems	3.79	0.66	4.03	0.76
Mean score on responsiveness	3.82	0.55	4.10	0.62
Assurance				
14. Staff are trustworthy	3.92	0.60	4.15	0.67
15. Feel secure in receiving services from the staff	3.83	0.63	4.02	0.69
16. Staff are courteous	3.98	0.59	4.16	0.67
17. Staff work together in the patients' best interest	3.84	0.62	4.02	0.71
Mean score on assurance	3.87	0.52	4.11	0.60
Empathy				
18. Staff give you individual attention	3.77	0.66	4.00	0.76
19. Convenient operating hours for patient needs	3.74	0.65	3.96	0.76
20. Staff know what your needs are	3.81	0.62	3.99	0.75
21. Staff give you personal attention	3.76	0.64	3.99	0.71
22. Clinic has your best interests at heart	3.78	0.65	4.01	0.74
Mean score on empathy	3.75	0.54	4.00	0.65
Potential patient loyalty				
1. Global satisfaction with the clinic visit	3.88	0.70	4.12	0.70
2. Willingness to return to this clinic	3.95	0.71	4.19	0.71
3. Willingness to recommend the clinic to others	3.87	0.78	4.12	0.75
Mean score on potential patient loyalty	3.9	0.64	4.16	0.65

Response scale: 1–5 (very low/little = 1 to very high/much = 5).
[1]All differences between solo and group practice significant at $P < 0.001$.

Past authors have tapped into the relative importance of each of dimension by asking respondents to split a total of 100 points between the five dimensions [21,22,24,30]. Due to the variable educational level of our patients, we avoided the complex judgment process involved and chose instead to examine the relative importance of each dimension by comparing their effect sizes on the criterion variable, PPL, after controlling for the effects of demographic variables. According to this criterion, reliability is the most important dimen-

sion (parameter estimate for reliability = 0.25 in Table 4), the highest estimate of all the quality dimension estimates. This indicates that a unit increase in the Realiability score is associated with a 0.25 unit increase in the Potential Patient Loyalty score. Since realiability is the most influential among all the quality dimensions in the regression, it suggests that timeliness and accuracy of performance are the most desired service qualities, followed by responsiveness and empathy, which have the next highest parameter estimates. These findings are consistent

Table 3 Predictors of the five dimensions of perceived service quality in solo and group practice in Taiwan

Independent variables	Dependent variables									
	Tangibles		Reliability		Response		Assurance		Empathy	
	Est.	*P*-value	Est.	*P*-value	Est.	*P*-value	Est.	*P*-value	Est.	*P*-value
Intercept	4.31	0.001	4.19	0.001	4.43	0.001	4.47	0.001	4.33	0.001
Clinic type										
Group practice	0.30	0.004	0.25	0.037	0.31	0.001	0.26	0.008	0.28	0.021
Solo practice (reference group)										
Age (years)										
18–30	−0.39	0.001	−0.38	0.000	−0.50	0.001	−0.46	0.001	−0.53	0.001
31–50	−0.30	0.001	−0.38	0.000	−0.46	0.001	−0.34	0.001	−0.50	0.001
51–65	−0.06	0.33	−0.10	0.15	−0.23	0.001	−0.16	0.014	−0.20	0.004
≥66 (reference group)										
Gender										
Male	−0.05	0.10	0.00	0.97	0.02	0.48	−0.02	0.56	0.01	0.71
Female (reference group)										
Highest educational level										
Elementary/junior high school	0.01	0.76	0.07	0.13	0.00	0.94	−0.06	0.15	−0.01	0.85
Senior high school	0.05	0.16	0.11	0.004	0.06	0.08	0.01	0.73	0.01	0.77
College and above (reference group)										
Marital status										
Married	−0.01	0.64	0.01	0.75	0.06	0.15	−0.03	0.48	0.05	0.20
Single[1] (reference group)										
Specialty related to illness[2]										
Internal medicine (reference group)	−0.15	0.016	0.02	0.72	0.01	0.86	−0.09	0.16	−0.02	0.79
Obstetrics and gynecology	−0.14	0.05	0.03	0.68	−0.05	0.48	−0.09	0.22	0.16	0.035
Pediatrics	0.15	0.06	0.24	0.003	0.16	0.041	0.06	0.41	0.23	0.003
Family medicine	0.10	0.24	0.23	0.014	0.15	0.09	0.21	0.016	0.21	0.015
Otorhinolaryngology	−0.00	0.98	0.03	0.73	0.04	0.68	−0.04	0.58	0.07	0.45
Orthopedics	0.08	0.048	−0.18	0.049	−0.21	0.016	−0.17	0.040	−0.19	0.028
Dermatology	0.07	0.001	0.33	0.001	0.19	0.006	0.16	0.021	0.11	0.12
Rehabilitation	0.07	0.48	0.12	0.12	0.05	0.48	0.12	0.10	0.15	0.036
Others/subspecialties (reference group)										
Random effect associated with location	0.02		0.02		0.04		0.02		0.05	
Random effect associated with clinic	0.03		0.04		0.02		0.02		0.04	

Est., estimate.

[1]Includes never married, widowed, divorced, and separated.

[2]Patients may visit a specialist (such as pediatrician) for general health problems, or a specialty other than the condition suggests (e.g. a patient with a skin ailment may visit her obstetrician or internist).

with other authors who studied outpatients' quality perceptions [22,23].

PPL is the criterion variable used in this study, conceptualized as an aggregate of global satisfaction with the visit and its behavioral counterpart, willingness to return to the clinic in future as well as recommend it to others. PPL may be a strategic service objective for clinics to retain and/or expand market share. There is little documentation on the correlation of return-to-provider behavior with patient satisfaction or with previous intent to return. Small but significant associations between repeat hospitalizations in the same hospital within 2 years of a survey, and a minority of satisfaction items are documented [31]. However, only one hospital was studied, and data on the respondents' need for hospitalization during this period, and admissions to other hospitals in the market, were missing from the study. There is no documentation of longitudinal studies of return-to-provider behavior using data covering the universe of health care encounters of panel patients. Our construct of PPL, albeit reliable and theoretically plausible, will need empirical validation by future research using a criterion variable—actual return-to-provider behavior. Data gathered by Taiwan's NHI system should enable such an analysis.

Table 4 Predictors of potential patient loyalty: hierarchical regression models excluding and including the service quality variables

Independent variable	Model without service quality variables		Model with service quality variables	
	Estimate	P-value	Estimate	P-value
Intercept	4.29	0.001	0.77	0.037
Service quality dimensions				
Tangibles			0.12	<0.001
Reliability			0.25	<0.001
Responsiveness			0.22	<0.001
Assurance			0.06	0.21
Empathy			0.18	<0.001
Clinic type				
Group practice	0.27	0.003	−0.04	0.34
Solo practice (reference group)				
Age (years)				
18–30	−0.47	<0.001	−0.09	0.14
31–50	−0.29	<0.001	0.03	0.57
51–65	−0.10	0.19	0.02	0.74
≥66 (reference group)				
Gender				
Male	−0.09	0.015	−0.03	0.005
Female (reference group)				
Highest educational level				
Elementary/junior high school	0.02	0.61	0.00	0.91
Senior high school	0.06	0.14	0.01	0.73
College and above (reference group)				
Marital status				
Married	0.02	0.62	0.00	0.99
Single[1] (reference group)				
Type of (specialty related to) illness[2]				
Internal medicine	0.06	0.35	0.09	0.10
Obstetrics and gynecology	0.21	0.013	0.21	0.002
Pediatrics	0.18	0.042	0.01	0.85
Family medicine	0.19	0.06	0.03	0.73
Otorhinolaryngology	−0.01	0.92	−0.03	0.65
Orthopedics	0.1	0.31	0.25	<0.001
Dermatology	0.26	0.001	0.07	0.26
Rehabilitation	0.26	0.002	0.17	0.008
Multi-specialty (reference group)				
Random effect associated with location	0.031		0.005	
Random effect associated with clinic	0.021		0.002	

[1]Includes never married, widowed, divorced, and separated.

[2]Patients may visit a specialist (such as pediatrician) for general health problems, or a specialty other than the condition suggests (e.g. a patient with a skin ailment may visit her obstetrician or internist).

Policy and management implications in Taiwan

Our documentation of superior service quality in group practices relative to solo practices, along with the documented superiority of group practices from a logistic and professional synergy perspective, substantiates the case for encouraging solo practices to consolidate into groups. Functional quality appears to follow from their structural advantages (economies of scale and pooling of administrative/financial resources), an effect that may be mediated by ena-

bling group practices to hire better qualified and motivated staff. Our findings suggest that consolidation into groups is a win–win situation for all. Patients and physicians both benefit. The government benefits as well, due to the resulting market-driven shift in the population's outpatient care preferences to office-based settings, and consequent reduction in health care expenditures. As Taiwan's DOH strives to enhance the quality of health care, it may find in the adapted SERVQUAL an effective instrument to monitor the functional quality of care,

in addition to its current monitoring of technical quality and clinical outcomes. For providers, the association of service quality with PPL indicates the strategic importance of improving service quality to retain and expand market share.

Implications for other countries

Our study findings also have implications for the health systems of other countries. With the ascendance of managed care in the United States, and managed competition in many Western countries, payers and purchasers of services encourage primary care provision at office-based practices rather than hospitals, as they strive to cut both short- and long-term costs. Office practice-based care is more economical, geographically and logistically more accessible, and potentially offers better continuity of care and outcomes for ambulatory conditions. Our study suggests that countries seeking to reform their health systems need to evaluate service quality in solo versus group practices from a quality and strategic marketing perspective. Based on our study findings, we believe that our adapted version of the SERVQUAL instrument is appropriate to evaluate the functional quality of outpatient care.

Study limitations and future research

The study did not control for important confounders such as self-reported health status, illness severity, and physician characteristics, which could impact quality perceptions due to potential attribution effects. Future studies should account for these factors. Our clinic sample and study design were also inadequate to explore the effects of multi-specialty versus single-specialty practices.

A major lacuna in health care quality research has been the lack of longitudinal studies to examine functional quality versus technical quality (including health outcomes), due to lack of centralized databases across providers and patients. Taiwan's NHI database covering every health care encounter is uniquely poised to accommodate longitudinal studies to examine these associations.

Acknowledgements

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