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Ambulatory care visits and quality of care: does the volume-control policy matter?

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Abstract

Using claims data from the Bureau of National Health Insurance (BNHI) in Taiwan and primary data collected from 940 patients who visited their physicians at out-patient clinics to complete questionnaire, we investigated the effects of the hospital volume control policy on the frequency of visits, medical expenses and patient satisfaction. We found that the volume control policy on ambulatory care decreased physician fees and increased both the number of visits and co-payments. However, it did not result in any change in the total medical expenses. A shift in ambulatory care expenditure from BNHI to patients did not improve patient satisfaction. While the patients were comfortable with the waiting line, they were not satisfied with the providers' strategy of limiting quota of visits during a period of time.

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1. Introduction

1.1. Taiwan's NHI and medical expenditure

Taiwan implemented its National Health Insurance Program (NHI) in 1995 to provide affordable quality, and universal coverage for the benefit of every citizen. Because participation in the program is mandatory,

96% of the total population receives coverage, including almost eight million Taiwanese who previously had no health insurance [1,2]. NHI develops a comprehensive point system schedule, in which there are already more than 10,759 items listed. In addition, BNHI is in the process of combining its 23,000 approved pharmaceuticals into groupings and determining pricing methods (Lai, personal communication, December 22, 2004).

The Bureau of National Health Insurance (BNHI) pays medical expenses on a fee-for-service basis and its beneficiaries participate in a co-payment program.

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The fees are calculated using different methods. Some services and procedures, such as for enteritis, hypertension, and diabetes mellitus, are paid on itemized fee-for-service payment system; others such as hemodialysis, vaginal deliveries, and cesarean sections, are paid on a per-case basis. The case payment has been up to 174 items by 2004. Patients are allowed to have free choice of providers with a co-payment (10% for inpatient care, <20% for outpatient care, and no deductible). Extra co-payments are required for ancillary tests and medicines exceeding certain amounts. Also, providers, including hospitals, are paid mainly based on an itemized fee-for-service payment system.

The total ambulatory care expenditure amounted to NT\$ 224.3 billion in 2002, which is 66% of the total medical expenses. In the same year, inpatient care costed the country NT\$ 115.4 billion, which is 34% of total medical expenses. Annual ambulatory care visits grew to 14.81 per capita in 2000 from 13.87 in 1996 [3].

1.2. Volume control and cost containment

Since most BNHI funds are spent on ambulatory care, the BNHI has tried different methods including cost sharing at the point of service, diagnosis related groups, global budgets, utilization management, and supply limits to suppress the rapid growth of health care expenditures. From 1986 to 1999, almost every year, medical centers and regional hospitals grew over 10% in their volumes of ambulatory patients and physician fees, whereas community hospitals were around 8% [4]. It will harm the quality of patient care eventually if hospitals continuously increase their volume without improving their numbers of physicians, and necessary equipments and plants. On January 1, 2001, therefore, BNHI implemented a volume control policy to contain costs and to improve the quality of ambulatory care for regional hospitals and medical centers. By means of such control policy, referrals of some trivial severity of illness patients from medical centers or regional hospitals to the community hospitals are expected. A good referral system will assist medical centers and regional hospitals to take more care of the intensive or acute patients, which is one of their important social missions. Additionally, the referral system has an advantage of changing patient behavior by not squeezing them into medical centers or regional hospitals just for minor dis-

eases. Although the policy is for regional hospitals and medical centers, it is recognized that this policy may have influence on both hospitals and physicians since most of the physicians are employees of hospitals in Taiwan.

The volume control policy sets a threshold for ambulatory care visits. The physician would be paid NT\$ 213 for treating a specified number of patients. Beyond that number, the physician would be paid down to NT\$ 120. For example, one physician has 55 patients within a section (defined by morning, afternoon, or evening sections); however, his/her threshold was set up by 50 patients. Then his/her payments will be the sum of 50 patients multiplied by NT\$ 213 and 5 patients multiplied by NT\$ 120. The final reimbursement payment for this physician in the particular section will be NT\$ 11,250. Nevertheless, if the previous example followed the original payment method, NT\$ 207 per visit, the total will be NT\$ 11,385. The difference is not much when there is only one physician within one section; however, there will be a significant distinction when amounted to all physicians and all sections. BNHI (2002) estimated that the volume of ambulatory care would be around 81% of previous volume of ambulatory care [4].

The threshold is determined by a formula, calculated by weighting ambulatory care visits from previous year, staffed beds, and numbers of physicians with a weighted sum of multiplying 2/3, 1/6, and 1/6, for the respective components. A detailed description of the formula is referred to [Appendix A](#). To make sure, this policy would not have negative influence on patients who need urgent medical attention, emergency services, immunization, dialysis care, home care, psychiatric rehabilitative care, work related injury, flu vaccine for elderly, and chronic care services were excluded. Community hospitals and independent practice clinics have been exclusive of this policy due to the continuously decline of their growth rates since 1990. In particular, the amount of community hospitals is bringing down with lightning speed, with 108 hospitals closing down during 7 years from 1994 to 2002 [5].

The purpose of this study is to contribute to the literature on cost containment mechanism by examining the effect of volume control policy on frequency of ambulatory care visits, medical expenses, and patient satisfaction. More specifically, taking the perspective

from insurers trying to affect health care costs through controls on the way in which providers supply health care, we propose that the effect of volume control will decrease the frequency of visits, medical expenses, and increasing patient satisfaction by improving quality of care.

2. Methods

2.1. Sample and procedures

There are two data sources for this study. The first one was collected from ambulatory care patients. We used simple random sampling to draw one-half of 25 medical centers and one-thirds of 78 regional hospitals. The initial sample included 13 medical centers and 26 regional hospitals. However, four regional hospitals were deleted from our final study sample because they were closed down in the year 2001. Thus, the resulting sample included 13 medical centers and 22 regional hospitals. Then, we determined 490 patients from medical centers and 510 patients from regional hospitals according to their staffed beds to conduct face-to-face interviews. Only established patients, defined as not first time visit, were included. Sixty patients were not willing to participate and then excluded from this study. Final study sample contained 940 patients with 94% effective response rate. The study was approved by the Research Ethics Committee of Bureau of National Health Insurance. The questionnaire was constructed by structured questions, including questions on the aspects of present visits, self-comparison between this time visit and before the new policy, patient satisfaction, and personal information. An expert review panel was convened to confirm and revise the questionnaire. The panel consisted of three clinicians, three academic scholars, and one health care administrator. The interviewers' training involved both the general introduction to survey interviewing and fieldwork techniques and procedures, and a review of specific aspects of the study for which interviewers were responsible. The period for collecting the primary data was from July 20, 2003 to August 20, 2003. The second data source for this study included 1999 and 2001 of BNHI claim databases. Initially, there were 25 medical centers and 78 regional hospitals in the year 2001 in Taiwan. We merged 2001 databases with 1999

databases by matching the same hospital scrambled identification numbers (IDs). Only 60 hospitals could be reached. We were certain that in the study, 35 hospitals of primary data were included within the 60 hospitals because these 35 hospitals existed both in 1999 and 2001. The reason for not using 35 study hospitals of primary data only for the secondary analyses was that the real IDs could not be released from BNHI. Therefore, there was no way to match the specific 35 hospitals for secondary analyses. In total, 82,159 observations were taken from 1999 and 96,131 observations from 2001 databases. The data of year 2000 were not used because this particular year was prior to the new policy implementation and many hospitals informally received the information of the calculation formula before the official announcement. In consequence, the hospitals could prepare for responding to the new policy by increasing their ambulatory care visits to assure that their volume threshold is higher than their expectation (please refer to [Appendix A](#) for the components of the formula). The claim databases provided detailed data on physician fees, drugs, procedures and treatments, co-payments, and number of visits.

2.2. Measures and analyses

Seven variables were included to examine whether the volume control policy had influence on the number of outpatient visits and ambulatory care costs. The seven variables included total number of visits, co-payment, prescription fee, procedures and treatments, physician fees, pharmacist fees, and the total costs of ambulatory care. We estimated the total cost of ambulatory care by combining the costs of physician payments, procedures and treatments, pharmacy, and co-payments. Paired *t*-test was used to examine if there were any statistically significant changes in ambulatory care visits and ambulatory costs before and after the new policy was implemented.

To examine how volume control impacted on patient satisfaction, we employed one dependent variable, five independent variables, four control variables, and one interaction variable. The dependent variable was the patient satisfaction score as measured by sum of seven questions. Patient satisfaction has emerged as an increasingly important measure in the assessment of health care quality. Literature indicate that

patient satisfaction, viewed as an outcome of health care delivery, is an indicator of quality of care in patient care settings [6–11]. Donabedian describes four specific reasons for investigating patient satisfaction. First, satisfaction is an objective of care; second, satisfaction is also a consequence of that care, and therefore an outcome; third, satisfaction can contribute to the effects of care as a satisfied patient is more likely to comply with advice; finally, satisfaction is also the patient's judgment on the care that has been provided [12].

The original satisfaction measure of this study included nine questions, which was constructed by a focus group meeting to identify issues of importance to patients and possible questionnaire items. Then, an expert panel, as described above, helped modification or removal of items to eliminate ambiguity and reduce non-response and skewed responses. Factor analysis (table not shown) indicated seven scales out of nine (satisfaction with time spent with their physicians, doctor's attitude, history-taking, eliciting family information, effectiveness of prescribed therapy, advice about prescription, feedback on evaluation results (clarity of explanations)) related to overall satisfaction, and containing issues identified as important to patients. Therefore, we removed two items. The overall Cronbach's alpha reliability for the satisfaction measure was 0.724.

The five independent variables were: total number of patients within the same section (defined by morning, afternoon, or evening sections), duration of waiting time (self-reported waiting time—the time that the patient arrived at the clinic to the time the patient saw a physician), time spent with physician (defined as the time that the physician spent in face-to-face contact with the patients, as reported by patient), out-patient clinic quota (by asking respondents if their physicians set the limits for number of patient visits within a section), and specialty (defined as medical, surgical (as reference group), GYN, and others). The four control variables contained age (in years), gender (male or female), education (elementary and below, middle, high, or undergraduate and above (as reference group)), and occupation (labor (as reference group), student, officer, business, housewife, or others). From reviewing literature, we thought that the effect on the response variable of one independent variable (time spent with physicians) is modulated by an

other independent variable (patient numbers) [13–16]. Thus, the interaction variable (patient numbers multiplied by time spent with physicians) was included in the model.

Next, stepwise multiple regression was performed, using SPSS 11.0, to examine the statistical significance of associations among patient satisfaction scores (dependent variable), practice behaviors (five independent variables), and characteristics of patients (four control variables).

3. Results

3.1. Ambulatory visits and medical expenses

The number of ambulatory care patient visits rose from 1314 in 1999 to 1387 in 2001 (Table 1). There was a marked increase in the average of annual visits after the new policy (t -value = 3.74, p -value = 0.0004). Physician fees decreased from NT\$ 219 per visit in 1999 to NT\$ 195 per visit in 2001 (t -value = -3.13, p -value = 0.003). On the other hand, co-payment was found to be statistically and significantly increased after the new policy was implemented, to an average of NT\$ 153 per visit (t -value = 8.76, p -value < 0.0001). There was no difference in prescription, procedures and treatments, pharmacist fee, and hospitals' total claim amounts.

3.2. Patient satisfaction

The results from this study indicated that most patients expected that the maximum number of patients for a physician–patient visit should be limited to 30 during a 3-h section (table not shown). It was far lower than the actual average numbers of patients a physician took, which is 53 per section. The physician–patient visiting time ranged between 1 and 30 min, with an average 8 min (table not shown). The average waiting time for most of respondents was 16–30 min (38.07%), followed by under 15 min (29.44%), 31–60 min (24.37%), and greater than 60 min (8.12%) (table not shown).

Regression results indicated that when compared with the satisfaction level of surgical patients, medical patients at ambulatory care clinics were more likely to be dissatisfied (t -value = -1.13, p -value = 0.04).

Table 1
Paired *t*-test for hospital ambulatory care visits and medical expenses, selected years 1999 and 2001 (*n* = 60)

		Mean	Mean difference	S.D.	<i>t</i> -Test	
					<i>t</i> -Value	<i>p</i> -Value
Total number of visits	2001	1387.60				
	1999	1314.15				
	2001–1999		73.45	152.31	3.74	0.0004
Co-payment	2001	152.90				
	1999	127.23				
	2001–1999		25.67	18.15	8.76	< 0.0001
Prescription fee (1)	2001	655.44				
	1999	677.39				
	2001–1999		–21.95	15.52	1.09	0.27
Procedures and treatment (2)	2001	386.58				
	1999	389.77				
	2001–1999		–3.19	2.26	1.05	0.29
Physician fee (3)	2001	195.37				
	1999	219.11				
	2001–1999		–23.74	16.79	–3.13	0.003
Pharmacist fee (4)	2001	43.26				
	1999	45.71				
	2001–1999		–2.46	1.74	–0.05	0.95
Claim amount (1 + 2 + 3 + 4)	2001	1280.64				
	1999	1331.98				
	2001–1999		–51.34	36.30	0.69	0.49

Notes: (1) Paired *t*-test was used. (2) Only including the numbers of the same hospitals between 1999 and 2001. (3) Unit of analysis was per visit. (4) S.D. means standard deviation.

Respondents whose physicians set limits on quota were less likely to be satisfied (*t*-value = –0.01, *p*-value = 0.003).

Most socio-demographic variables were excluded from the final regression analysis, as they were weak predictors of satisfaction. Education and occupation could be the proxy variables of social class [17]. Education level could be a factor to some extent in dif-

ferentiating patient satisfaction, but the difference was found to be significantly lower in patients with middle school educations only, compared with patients with undergraduate degrees or above (*t*-value = –2.55, *p*-value = 0.003). We also found that students, as opposed to laborers, had become less satisfied with ambulatory care after the new policy was implemented (*t*-value = –2.80, *p*-value = 0.006). The adjusted R^2 of

Table 2
Stepwise regression for patient satisfaction after the volume control policy implementation

Variables	β	S.E.	<i>t</i> -Value	<i>p</i> -Value
Intercept	35.81	2.97	12.06	<0.0001
Middle vs. undergraduate or above	–2.55	0.85	–2.98	0.003
Actual waiting time 16–30 min vs. over 90 min	–1.16	0.57	–2.04	0.043
With limit quota	–0.01	0.01	–3.03	0.003
Students vs. labor	–2.84	1.02	–2.80	0.006
Medical vs. surgical	–1.13	0.55	–2.06	0.040
Adjusted R^2	0.144			
<i>F</i>	6.16***			

* $p < 0.005$; ** $p < 0.01$; *** $p < 0.001$.

this model was 14.4% (F -value = 6.16, p -value < 0.001) (Table 2).

4. Discussion

4.1. Increased visits and decreased on physician fee

As mentioned earlier, increase in the volume of visits past a certain monthly threshold results in a fee reduction for physicians. To respond to the fee reductions, physicians may increase the demand for services by requesting patients to visit him/her more frequently than before for the same medical problems. This was evidenced by an increased number of visits. Moreover, if physicians' incomes are threatened by the decrease in utilization that accompanies increase in cost sharing, it is possible that they would attempt to shift the burden to other patients by increasing the demand of patients who were otherwise less affected by cost sharing.

Using volume control has had limited success at restraining the growth of overall ambulatory health expenditures. While the decrease in physician costs has been attributed to the volume control, the providers, e.g. the hospitals, respond to the fee controls by "inducing" greater use of their services, a finding similar to that of Rice and Labelle [18]. In addition, providers may try to shift the costs to the consumer side by increasing revenue of co-payments due to frequency visits and sales of out-of-pockets items [19]. The former could be a possibility supported by evidence through the increase in co-payments from our study. The phenomenon from our results is also quite consistent with the Grand's "ballon" effect, which indicated compression in one part of the system leading to expansion elsewhere [20].

4.2. Volume control leads to patient dissatisfaction

Quota restriction makes the access more difficult to necessary care. Patients would rather be waiting longer time than have no access to providers right away. However, to follow the policy of volume control, providers (including both hospitals and physicians) would set a quota on out-patient clinic visits to reduce the volume. Consequently, decreasing access to health care and decreasing the level of satisfaction are unavoid-

able outcomes. This was supported by our results, limiting quota predicted patient dissatisfaction. However, setting limits within one section does not necessarily mean that physicians would not ask patients to come back more often than before. This is the reason why the number of visits in average was going up after the new policy implementation.

The evidence from this study also suggests that medical patients are less satisfied than surgical patients. In general, the outcomes of surgical patients can be detected within a short period of time, while the positive results of treating medical patients are less apparent because their conditions tend to be more complicated or chronic. This is consistent with Birkmeyer and Weinstein's findings [21]. They used meta-analysis to analyze eight observational studies and one randomized clinical trial and concluded that patients were satisfied with better short-term outcomes (e.g., functional status and employability) with surgery than with medical approaches [21]. With the implementation of NHI in Taiwan, the patients are sufficiently insured and they have easy access to necessary, not elective, surgical procedures [22]. In our sample, all of the surgeons are specialists, whereas most of the medical doctors are general practitioners. We found that patients were more satisfied with the specialists than with the general practitioners, a finding quite consistent with the current literature [23–25].

In summary, using volume control policy to contain patients' visits and medical expenses reduces the physician fee while increasing the frequency of visits, raising the co-payments results in no obvious change in the total ambulatory care expenses. However, the providers' response to policy by limiting number of patient visits per time period, in order to keep fees up, might have negatively affected the satisfaction. Our findings substantiate the fact that physician specialty and perceived level of competence are positively associated with the patient satisfaction.

4.3. Limitations

Although we were able to capitalize 2 years of data to examine the change of ambulatory visits and medical expenses before and after the volume control policy implemented, several limitations remain. Our secondary data represents only insured Taiwanese patients, around 96%. Additionally, there was a new pol-

icy on changing prescription reimbursement started as on April 2001. Up to date, no published paper indicates that new policy had an effect on the prescription fee changes.

Our primary data on patient satisfaction are limited to a small sample size and a short period of observation. In addition, we collected the primary data during the summer of 2003; after 2 years of the volume control policy, there may be other policies simultaneously implemented, which may confound our results. More specifically, we searched all the health care policies during the study years and found that there was an outbreak of severe acute respiratory syndrome (SARS) between April and May 2003. Because SARS was mostly contracted in the hospital settings in Taiwan, it might have temporarily influenced the patients' level of satisfaction with their health care providers.

To examine the long-term effects of the volume control policy, sufficient information should be needed. An apparent complexity is that one policy (measure of costs containment) is quickly followed by another—before there is time to see the effects of the first time policy [20]. Indeed, the effective life of different policies to contain expenditure is sometimes shorter than the time required to develop and introduce them. Moreover, cost containment policies are rarely introduced individually. Where more than one policy is introduced, it becomes difficult to assess the effect of each policy separately.

Patients' ability to recall the past is another concern. Questions, such as if the waiting time increases, decreases, or there is no difference after volume control policy implemented, needed patients to recall. Since the recall was necessary, we tried to make the questions more specific by using expert panels and the reference to major event, volume control policy. Considering the inevitable recall bias in the cross-sectional study, this study can only provide evidence of an association, and generalizations from our results regarding patient satisfaction should be cautious.

5. Conclusions and policy implications

Our analysis presents the effects of the new volume control policy by examining changes in the ambulatory care visits, medical expenses, and patient satisfaction. The “balloon” effect is observable from our results.

The effects of volume control have decreased on physician fee, but increased the numbers of ambulatory visits as well as co-payments. Providers have to cut down their volume by using quota limits strategy to comply with the policy. However, to make up their profits, they request more often ambulatory care visits accompanying with more revenue on co-payments. These organizational behaviors make patients uncomfortable, and furthermore, lead to dissatisfaction. It would be worthwhile to continuously monitor patient satisfaction as well as examine the long-term effect of volume control policy.

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Appendix A

1. The formula of the volume control is as follows:

$$[\text{Ambulatory visits} \times 0.85/270]^{2/3} + [\text{staffed beds} \times \text{weighted coefficient (3.55 for medical center or 2.60 for regional hospitals)}]^{1/6} + [\text{numbers of FTE physicians} \times \text{weighted coefficient (10.17 for medical center or 15.24 for regional hospitals)}]^{1/6}.$$
2. Seven questions of patient satisfaction:
 - (1) Are you satisfied with the time spent with your physician?
 - (2) Are you satisfied with your doctor's attitude?
 - (3) Are you satisfied with the history-taking you received from your physicians?
 - (4) Are you satisfied with the eliciting family information from your physicians?
 - (5) Did your physicians adequately explain your diagnosis and treatment to you?
 - (6) Are you satisfied with the advice about prescription from your physicians?
 - (7) Are you satisfied with the feedback on evaluation results?

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