Why do people in Taiwan select the outpatient clinic of the medical center? A nationwide analysis

Ming-Hwai Lin [Corresp., 1, 2], **Tzeng-Ji Chen** [1, 2], **Shinn-Jang Hwang** [1, 2]

[1] Department of Family Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

[2] School of Medicine, National Yang-Ming University, Taipei, Taiwan

Corresponding Author: Ming-Hwai Lin
Email address: mhlin@vghtpe.gov.tw

Introduction. In contrast to other countries, Taiwan's National Health Insurance (NHI) program allows patients to freely select the specialists and tiers of medical care facility without a referral. Some medical centers in Taiwan receive over 10,000 outpatients per day. In the NHI program, the copayment was increased for high-tier facilities for outpatient visits in 2002, 2005, and 2017. However, the policies have only mildly reduced the use of high-tier medical care facilities. The main purpose of this study was to explore the factors contributing to patients' selection of the outpatient clinic of medical centers without a referral. **Methods.** An online anonymous survey was conducted from September to October 2018. A nationwide sample in Taiwan was recruited using convenience sampling through social media. Based on a literature review and a focus group, 20 factors that may affect the choice of the outpatient institution were constructed. **Results.** A total of 987 valid responses were collected. In univariate analysis, "institution has high-quality drugs," "institution has a diverse specialty," and "institution was recommended by friends or relatives" had the largest effect on patients' selection of an outpatient institution. Low copayment was least considered to be an important factor. Exploratory factor analysis revealed that three main factors, namely "physician factor," "image and reputation factor," and "facility and medication factor," affected the outpatient choice. Multiple logistic regression indicated no significant correlations between gender, education, income, and residence in the selection of outpatient institutions. Patients who reported that hospital facilities, high-quality drugs, and diverse specialties were very important were 81.5% more likely to select the outpatient clinic of a medical center when ill (95% CI: 40.7%–134.1%). Patients who reported that the image and reputation of the hospital were very important were 28% more likely to select the outpatient clinic of a medical center (95% CI: 4.2%–57.4%). Patients who were previously satisfied with their experience of the primary clinics or had a regular family doctor were less likely to choose a medical center (OR 0.506, 95% CI: 0.432–0.592 and OR 0.672, 95% CI: 0.468–0.964). **Conclusion.** In Taiwan,

numerous patients visit medical centers because they believe that the medical center has good hospital facilities, high-quality medicines, and diverse expertise. Patients with good primary medical experience and regular family physicians had significantly lower rates of selecting the outpatient clinic of a medical center. The results of this study support that the key to establishing graded medical care is to prioritize the strengthening of the primary medical system.

Article

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Ming-Hwai Lin[1,2,*], Tzeng-Ji Chen [1,2], and Shinn-Jang Hwang [1,2]

[1] Department of Family Medicine, Taipei Veterans General Hospital, No. 201, Sec. 2, Shi-Pai Road, Taipei 112, Taiwan
[2] School of Medicine, National Yang-Ming University, No.155, Sec.2, Linong Street, Taipei, 112, Taiwan

* Author to whom correspondence should be addressed; E-Mail: minghwai@gmail.com; Tel.: +886-2-2875-7458; Fax: +886-2-2873-7901.

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Abstract:

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"institution was recommended by friends or relatives" had the largest effect on patients' selection of an outpatient institution. Low copayment was least considered to be an important factor. Exploratory factor analysis revealed that three main factors, namely "physician factor," "image and reputation factor," and "facility and medication factor," affected the outpatient choice. Multiple logistic regression indicated no significant correlations between gender, education, income, and residence in the selection of outpatient institutions. Patients who reported that hospital facilities, high-quality drugs, and diverse specialties were very important were 81.5% more likely to select the outpatient clinic of a medical center when ill (95% CI: 40.7%–134.1%). Patients who reported that the image and reputation of the hospital were very important were 28% more likely to select the outpatient clinic of a medical center (95% CI: 4.2%–57.4%). Patients who were previously satisfied with their experience of the primary clinics or had a regular family doctor were less likely to choose a medical center (OR 0.506, 95% CI: 0.432–0.592 and OR 0.672, 95% CI: 0.468–0.964).

Conclusion. In Taiwan, numerous patients visit medical centers because they believe that the medical center has good hospital facilities, high-quality medicines, and diverse expertise. Patients with good primary medical experience and regular family physicians had significantly lower rates of selecting the outpatient clinic of a medical center. The results of this study support that the key to establishing graded medical care is to prioritize the strengthening of the primary medical system.

Keywords: primary clinic; national health insurance; outpatient clinic; choice of medical institution; medical choice; survey

1. Introduction

The National Health Insurance (NHI) program in Taiwan is a single-payer system founded in 1995. The NHI program comprises a hierarchy of medical care facilities consisting of four tiers: medical centers, regional hospitals, local community hospitals, and primary clinics. However, referral systems have not yet been successfully implemented.

In most countries, primary care physicians act as healthcare “gatekeepers” by providing initial medical interventions and referring patients to additional specialists. In contrast with other countries, patients in Taiwan have full and unrestricted access to all medical care facilities. Patients in Taiwan's NHI program can freely select specialists and the tier of medical care facility directly without a referral (Chen et al. 2006).

The design of global budget payments and the fee for services result in patients favoring treatment at large hospitals, even for mild diseases, and medical centers are more likely to use advanced instruments and pharmaceuticals (Kuo et al. 2019; Lee et al. 2018). Many patients in Taiwan not only consulted several physicians of different specialties and at different healthcare facilities, but also switched the physicians and facilities quickly (Lynn et al. 2015). This phenomenon has been suggested as a source of inefficiency in healthcare use and has resulted in high medical expenditures and costs of outpatient visits. Studies have reported that people in developed countries visit a doctor 5–6 times a year, whereas in Taiwan, the average frequency of visits is 13 . More than 30,000 insured residents in Taiwan seek hospital inpatient and outpatient services over 100 times a year (Chen et al. 2006; Lynn et al. 2015). In certain large medical centers in northern Taiwan, the number of outpatients per day often exceeds 10,000. Furthermore, physicians frequently see over 50 patients in a morning, spending only 5 minutes or less for each consultation (Wu et al. 2010). These short consultations can cause misinformation and misunderstanding between healthcare providers and patients because of the time to build rapport. The freedom to have multiple hospital return visits results in high use of outpatient hospital visits, drug prescriptions, and other health services (Huang et al. 2003).

Excessive use of health services is a critical and persistent problem in Taiwan. To moderate these rising costs, a graded medical system was implemented in the NHI program and increased the copayment for high-tier facilities for outpatient visits in 2002, 2005, and 2017. Patients without a referral are charged an additional copayment ranging from 240 to 420 NTD (approximately 8 to 14 USD) for every visit to a high-tier medical facility. Although changes to the NHI copayment policies have mildly reduced the use of high-tier medical care facilities, studies have indicated that the effect of medical prices on people's medical behavior is very limited (Lee et al. 2018).

Factors affecting patients' selection of high-tier medical care facilities have not been fully identified. Cheng et al. reported that patients tend to base their judgment of hospital quality on

medical equipment (Cheng, 2015). Further research is required to clarify the motives underlying the public's choice of outpatient institution before establishing appropriate policies to establish a graded medical system in Taiwan.

2. Materials and Methods

2.1. Study design

The present study had a cross-sectional design. Initial tests and revision of the questionnaire were completed, and a nationwide sample in Taiwan was recruited using convenience sampling through an online anonymous survey from September 3 to October 31, 2018. The survey was distributed using social media (https://facebook.com/; https://linecorp.com/; and https://www.ptt.cc/index.bbs.html). All participants were invited to complete an anonymous self-administered online questionnaire, which required approximately 10 minutes to complete. Informed consent was requested from all participants on the first page of the questionnaire. Only participants who were at least 20 years old and were able to read Chinese fluently were given access.

A deduplication protocol was applied to identify multiple submissions and preserve data integrity, including cross-validation of the eligibility criteria of key variables and discrepancies in key data (Bowen et al. 2008).

No rewards were provided to participants. This study was approved by the Institutional Review Board of Taipei Veterans General Hospital (2017-07-009AC).

2.2. Questionnaire design

The main dependent variable of this study was "preferred choice of outpatient clinics when you are ill," and the independent variables were assessed using the following question: "Please indicate the importance of each of the following factors in your selection of an outpatient clinic when you were ill?" A total of 20 factors affecting the choice of the outpatient institution were included. These factors were based on a literature review and a focus group. Five experts were invited to modify the questionnaire for ensuring expert validity.

All respondents were asked to rate the importance of the 20 factors in the selection of an outpatient institution when they were ill on a 5-point Likert scale ranging from 1 = not at all important to 5 = very important.

At the end of the questionnaire, respondents were asked to provide demographic information and information on past experiences during outpatient visits at different hospital levels, attitudes towards copayment, and whether they have a regular family physician.

2.2 Reliability and validity analysis

The content of this questionnaire was obtained through the literature review and focus group, and it exhibited a satisfactory level of content validity. Five experts were invited to perform repeated questionnaire testing and discussion, and the questionnaire exhibited a satisfactory level of expert validity. At the beginning of the study, the questionnaire was pretested in 20 patients to determine if the content was appropriate and to ascertain whether the content was understandable. The internal consistency reliability test was used for reliability analysis. Cronbach's alpha of the questionnaire was 0.895, which is satisfactory.

2.3 Statistical analysis

Descriptive statistics were used to present the results for patient hospital choices. Independent samples t-tests and Chi-square tests were adopted to examine the association between respondents' demographic characteristics and their outpatient preference. A p value of <0.05 (two-tailed) was considered statistically significant.

The associations between items that affect the patients' choice of outpatient clinics were assessed using exploratory factor analysis. Measures of sample adequacy such as Kaiser-Meyer-Olkin (.868) and Bartlett's Test of Sphericity (significance .000) show that factor analysis can be applied. Principal component analysis was performed to identify the major factors by using a correlation matrix and oblimin rotation. Loadings over 0.5 were used to interpret components.

Multivariate logistic regression was conducted to determine which factors satisfactorily explained the dependent variable "visiting the outpatient clinic of the medical center for an illness without a referral."

The statistical software SAS (version 9.4) was used for statistical analysis.

3. Results

During the survey period, 5060 people browsed the online survey, and 1003 responded and completed the online questionnaires. Therefore, the response rate was 19.8%. We excluded 16 participants because of duplication (the same age, occupation, and answer options). Table 1 provides a comparison of the demographic characteristics of the patients who favor different institutions for outpatient visits.

Men accounted for 43.8% and women accounted for 56.2% of the 987 respondents included; 509 (51.6%) respondents favored visiting a primary clinic, 308 (31.2%) favored visiting the general hospital, and 170 (17.2%) favored visiting the medical center with a referral. Table 1 provides a comparison of demographic characteristics and preferred institutions for outpatient visits. Gender, marital status, and education level were not statistically related to the choice of outpatient visits. The choice of medical treatment facility was statistically related to income with low significance ($p = 0.026$). Patients with a monthly income of NTD 50,001–70,000 favored outpatient clinics of medical centers. People living in urban areas accounted for 65.8% of respondents. A larger number of people living in urban areas favored medical centers than patients living in other areas ($p < 0.001$). Approximately 51.5% of the respondents had regular family doctors. Significantly more patients who favor primary clinics for outpatient visits had had regular family doctors than patients who prefer medical centers (61.9% vs 41.2%, $p < 0.001$). Approximately 67.6% of the respondents were satisfied with their previous medical experience in primary care. Furthermore, patients who favored primary clinics for outpatient visits exhibited significantly higher satisfaction rates than patients who favored medical centers (75.2% vs 52.9%, $p < 0.001$).

Table 2 summarizes the associations between the numbers of respondents who rated a factor as “important” in the selection of an outpatient facility and their preferred outpatient institution. "Physicians were trustworthy" and “physicians explained in detail" were the most important factors to consider when choosing the outpatient institution.

In univariate analysis, the importance of six factors was significantly higher among the respondents who chose to visit a medical center ($p < 0.05$). These factors were "institution has high-quality drugs," "institution has diverse specialties," "institution was recommended by friends or relatives," "the visibility of medical institutions is high," "physicians are highly

reputable," and "physicians are prominent." Only 32.4% of the respondents considered low copayment to be an important consideration.

In this study, we conducted exploratory factor analysis to understand the potential common characteristics among factors and clarify the influencing factors. We used principal component analysis to extract data using a correlation matrix and oblimin rotation method. We removed six items because of cross-loading or because the factor load was too low (< 0.4). Factors with eigenvalues greater than 1, cumulative percentages of variance explained above 71.2%, KMO value reaching of 0.868, and p value of 0.000 were excluded. Three main factors were retained in the final extraction (Table 3), namely "physician factor," "image and reputation factor," and "facility and medication factor." We subsequently converted the scores to three factors into a multivariate analysis model.

Table 4 illustrates three models of logistic regression for predicting "visits to the outpatient clinic of the medical center for an illness." The multiple logistic regression revealed no significant correlations between gender, education, income, and residence regions in the selection of outpatient institutions. Age, past medical experience in primary clinics, copayment, regular family physician, equipment of the institution, drug-quality of the institution, and diversity of the institution specialties were the most valuable factors for prediction.

Model 2 indicated that the likelihood of choosing to visit a medical center when ill increased by 2.9% for every additional year of age (95% CI: 1.7%–4.1%) when other variables were controlled for. Patients who were previously satisfied with the medical experience of primary clinics had a 0.506 lower likelihood of choosing a medical center to visit when ill (95% CI: 0.432–0.592). Patients who rated copayment as important were 0.535 times as likely to select a medical center to visit when ill (95% CI: 0.360–0.796). People with a regular family doctor were 0.672 times less likely to select a medical center (95% CI: 0.468–0.964). Patients who rated the image and reputation of the hospital as very important were 28% more likely to select an outpatient clinic in a medical center when they were ill (95% CI: 4.2%–57.4%). Patients who reported that hospital facilities, high-quality drugs, and diverse specialties as very important had an 81.5% increased likelihood of selecting the outpatient clinic of the medical center (95% CI: 40.7%–134.1%).

4. Discussion

Several factors significantly affected the selection of the medical center, including older age, advanced equipment, high-quality drugs, good reputation and visibility, and diversity of specialists (Kamra et al. 2016). In this study, patients with regular family doctors, who were satisfied with the past medical experience in primary care and who rated copayment as important, were less likely to choose a medical center when ill. Gender, marital status, and education level did not affect the choice of outpatient visits.

Hierarchical medical care means that medical resources can be used the most efficiently through professional division in the medical system. Excluding situations of major illnesses and the urgent need for treatment at a medical center, people who are ill should first go to a family doctor or a nearby primary clinic. After doctors diagnose and treat patients, they could be referred to other specialty clinics or hospitals if indicated. The increment in the copayment had little effect on the population, making them more willing to visit primary clinics first (Yang et al. 2019).

In the present study, the choice of the outpatient institution was only slightly related to the income level, and few people rated low copayment as an important factor in the selection of an outpatient clinic. These results may be caused by the low copayment amount in Taiwan's NHI system. Furthermore, in the NHI program, most of the cost of medical treatment is waived for low-income households and catastrophic illness patients in Taiwan. Thus the financial burden is rarely a consideration in the patients' choice of outpatient institution .

The insurance system is fee-for-service in Taiwan. People who visit the medical center may have more blood tests or radiologic examinations ordered by their physician because no copayment is charged for the inspection. Furthermore, the current copayment of outpatient medicines is a fixed fee, the out of pocket maximum is only NTD$200 (approximately USD$6.7). Changing the health insurance system, such as changing the copayment to a fixed-rate coinsurance, appears to be the only method to eliminate unnecessary testing and medical waste (Victor et al. 2018).

Ideally, every older adult should have trusted primary care physicians who can provide outpatient services. However, in this study, older people had a greater likelihood to visit the medical center for outpatient visits. The reasons for this finding and whether the primary clinics in Taiwan meet the needs of the elderly warrant further study (Liu et al. 2012).

This study has several limitations. First, participants were recruited over the internet. Although the online survey represents a wide age range, this sample is generally younger and more highly educated; thus, these results may not be generalized to the entire population of Taiwan (Tengilimoglu et al. 2017). Second, the variance explained by the logistic regression model suggests that other significant factors determine outpatient clinic decisions (Cheng 2015; Yip et al. 2019).

Despite these limitations, this study is the first to investigate how the public they chooses outpatient institutions in Taiwan. Further research should explore the influencing factors among the older group.

5. Conclusions

Although the NHI copayment reforms had mildly reduced the probability that patients with minor ailments would choose to visit high-tier medical facilities, several studies have indicated that the effect of medical prices on people's medical behavior is limited.

A good primary medical experience and a regular family physician significantly reduces people’s likelihood of visiting the medical center without a referral. The results of this study support that the key to establishing graded medical care is prioritizing the strengthening of the primary medical system.

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Author Contributions

Ming-Hwai Lin conceived the idea for this study, carried out the analyses, and drafted the manuscript. Tzeng-Ji Chen and Shinn-Jang Hwang revised the manuscript. All the authors approved the final version of the manuscript.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Table 1(on next page)

Table 1. Demographic characteristics and preferred institution for outpatient visits (N = 987)

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	total	preferred institution for outpatient visit			*p* value
		primary clinic	general hospital	medical center	
	n = 987	n = 509	n = 308	n = 170	
	n (%)	*n* (%)	*n* (%)	*n* (%)	
age (mean, SD)	43.6 (10.6)	41.7 (10.7)	43.6 (10.3)	49.6 (8.8)	
sex: male	432 (43.8)	221 (43.4)	138 (44.8)	73 (42.9)	0.902
educational level					0.927
tertiary or below	149 (15.1)	76 (14.9)	48 (15.6)	25 (14.7)	
university	647 (65.6)	338 (66.4)	201 (65.3)	108 (63.5)	
postgraduate	191 (19.4)	95 (18.7)	59 (19.2)	37 (21.8)	
marriage					0.193
married	644 (65.2)	328 (64.4)	195 (63.3)	121 (71.2)	
others	343 (34.8)	181 (35.6)	113 (36.7)	49 (28.8)	
income					0.026
NTD < 15000	168 (17.0)	90 (17.7)	50 (16.2)	28 (16.5)	
NTD 15001–30000	130 (13.2)	70 (13.8)	37 (12.0)	23 (13.5)	
NTD 30001–50000	346 (35.1)	180 (35.4)	120 (39.0)	46 (27.1)	
NTD 50001–70000	176 (17.8)	74 (14.6)	57 (18.5)	45 (26.5)	
NTD > 70000	167 (16.9)	95 (18.7)	44 (14.3)	28 (16.5)	
area					< 0.001
urban	649 (65.8)	337 (66.2)	179 (58.1)	133 (78.2)	
suburban/rural	338 (34.2)	172 (33.8)	129 (41.9)	37 (21.8)	
residency					0.059
northern	662 (67.1)	335 (65.8)	199 (64.6)	128 (75.3)	
middle	115 (11.7)	59 (11.6)	40 (13.0)	16 (9.4)	
southern	163 (16.5)	96 (18.9)	48 (15.6)	19 (11.2)	
east/archipelagos	47 (4.8)	19 (3.7)	21 (6.8)	7 (4.1)	
have a regular family physician	508 (51.5)	315 (61.9)	123 (39.9)	70 (41.2)	< 0.001
satisfied with the experience of the primary clinic	667 (67.6)	383 (75.2)	194 (63.0)	90 (52.9)	< 0.001

Table 2(on next page)

Table 2. Association between the numbers of respondents who answered “important” to each factor when choosing an outpatient facility and their preferred outpatient institution

Table 2. Association between the numbers of respondents who answered "important" to each factor when selecting an outpatient facility and their preferred outpatient institution

factors considered when selecting an outpatient facility	Total	preferred institution for outpatient visit			*p* value
		primary clinic	general hospital	medical center	
	n = 987	n = 509	n = 308	n = 170	
	numbers of respondents who rated important (%)				
physicians are trustworthy	934 (94.6)	483 (94.9)	287 (93.2)	164 (96.5)	0.290
physicians explained in detail	919 (93.1)	476 (93.5)	282 (91.6)	161 (94.7)	0.375
physicians have a good medical practice.	887 (89.9)	449 (88.2)	281 (91.2)	157 (92.4)	0.190
the institution has advanced equipment	854 (86.5)	429 (84.3)	269 (87.3)	156 (91.8)	0.041*
have good medical experience	839 (85.0)	433 (85.1)	260 (84.4)	146 (85.9)	0.910
physicians are not in a hurry	830 (84.1)	432 (84.9)	250 (81.2)	148 (87.1)	0.190
consider the severity of the disease	828 (83.9)	419 (82.3)	264 (85.7)	145 (85.3)	0.380
physicians are gracious and kind	823 (83.4)	423 (83.1)	257 (83.4)	143 (84.1)	0.953
the institution has high-quality drugs	821 (83.2)	418 (82.1)	248 (80.5)	155 (91.2)	0.008**
the institution has convenient transportation	779 (78.9)	403 (79.2)	243 (78.9)	133 (78.2)	0.967
the institution has friendly staff	772 (78.2)	395 (77.6)	241 (78.2)	136 (80.0)	0.807
the institution has diverse specialties	742 (75.2)	361 (70.9)	239 (77.6)	142 (83.5)	0.002**
waiting time is not too long	667 (67.6)	353 (69.4)	212 (68.8)	102 (60.0)	0.067
the institution was recommended by friends or relatives	533 (54.0)	275 (54.0)	152 (49.4)	106 (62.4)	0.024*
the visibility of medical institutions is high	510 (51.7)	247 (48.5)	153 (49.7)	110 (64.7)	0.001**
institutions with a good reputation	462 (46.8)	228 (44.8)	138 (44.8)	96 (56.5)	0.021*
willing to prescribe for chronic diseases	433 (43.9)	223 (43.8)	136 (44.2)	74 (43.5)	0.991
physicians with a good reputation	398 (40.3)	189 (37.1)	122 (39.6)	87 (51.2)	0.005**
physicians are famous	375 (38.0)	175 (34.4)	113 (36.7)	87 (51.2)	< 0.001***

low copayment	320 (32.4)	166 (32.6)	106 (34.4)	48 (28.2)	0.382

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 3(on next page)

Table 3. Exploratory factor analysis loads and variance percentages for factors considered when selecting an outpatient facility

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factor items	factors loads		
	factor I: physician factor	factor II: image & reputation	factor III: facility & medication
physicians are not in a hurry	0.872		
physicians explained in detail	0.853		
physicians are gracious and kind	0.838		
physicians are trustworthy	0.821		
the ability of the physician is well known	0.540		
physicians with a good reputation		0.871	
physicians are famous		0.826	
institutions with a good reputation		0.739	
the visibility of medical institutions		0.628	
diverse specialty			-0.804
drug quality is trustworthy			-0.780
the institution has advanced equipment			-0.767
sum of squared loading (eigenvalue)	5.586	1.943	1.021
percentage of variance explained (%)	46.552	16.191	8.506
cumulative percentage of variance explained (%)	46.552	62.743	71.249
Cronbach's alpha	0.905	0.840	0.792

Kaiser–Meyer–Olkin (KMO): 0.868 Bartlett sphericity tests (0.000).

Six factors were removed because the factor load was too low (< 0.4) or because of cross-loading. The removed factors were "consider the severity of the disease," "institution has convenient transportation," "reasonable waiting time," "institution was recommended by friends or relatives," "willing to prescribe for chronic diseases," and "low copayment."

Table 4(on next page)

Table 4. Results of the logistic regression for predicting “visit to an outpatient clinic of the medical center for an illness”

1 **Table 4.** Results of the logistic regression for predicting "visit to an outpatient clinic of the medical center for an illness"

	MODEL 1			MODEL 2			MODEL 3		
variables	B	SE(B)	Exp(B)	B	SE(B)	Exp(B)	B	SE(B)	Exp(B)
age	0.031	0.006	1.031***	0.029	0.006	1.029***	0.027	0.007	1.028***
male	-0.197	0.176	0.821	-0.204	0.180	0.816	-0.219	0.187	0.804
past experience in primary clinics	-0.692	0.078	0.582***	-0.682	0.080	0.506***	-0.619	0.089	0.538***
consider copayment is important	-0.441	0.192	0.643*	-0.625	0.203	0.535*	-0.601	0.205	0.548**
have regular family physician	-0.365	0.179	0.694*	-0.398	0.184	0.672*	-0.418	0.187	0.658*
factor I: physician factor				-0.126	0.119	0.881	-0.106	0.121	0.899
factor II: image and reputation				0.247	0.105	1.280*	0.251	0.107	1.285*
factor III: facility and medication				0.596	0.130	1.815***	0.584	0.131	1.793***
lived in an urban area							0.230	0.213	1.258
lived area：northern Taiwan									
middle Taiwan							-0.259	0.308	0.772
southern Taiwan							-0.563	0.279	0.569*
eastern Taiwan							0.056	0.465	1.058
income degree							0.043	0.065	1.044
education：high school									
college							-0.393	0.229	0.675
postgraduate							-0.333	0.300	0.717
-2log likelihood		854.516			811.382			802.240	
Nagelkerke R2		0.541			0.575			0.582	
percentage of correctly classifying the outcome		82.0%			82.9%			82.6%	

2 *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$