Factors Influencing the Purchasing Behavior of TCM Outpatients in Taiwan

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Abstract

Objectives: To test the factors that influence Chinese medicine outpatients' behavior patterns in purchasing Traditional Chinese Medicine (TCM) under the National Health Insurance (NHI) system in Taiwan.

Methods: A structural questionnaire was developed and administered to randomly selected outpatients waiting for Chinese Medicine at pharmacies in two academic hospitals that offered Chinese Medicine services in central Taiwan. A total of 641 effective questionnaires were collected. SPSS 10.0 (Statistical Package for Social Sciences, SPSS Inc., Chicago, IL) was used to run descriptive analysis and one-way analysis of variance (ANOVA). In addition, LISREL 8.30 (Analytical Package, Scientific Software International, Inc., Chicago, IL) was used to modify and analyze the relationship between the variables of the hypothetical pathway model.

Results: Path analysis showed that "behavioral intention" and "suffering from disease" had positive and direct influences on the outpatients' patterns of purchasing TCM. Furthermore, "usable resources" was an important factor with direct influence on behavioral intention. When there were more usable resources, the behavioral intention became stronger and indirectly influenced the purchasing behavior of TCM outpatients. In addition, one-way ANOVA showed that the purchasing behavior was significantly influenced by the number of diseases that an individual suffered. The results of the pathway model showed that "behavioral intention" and "suffering from disease" had positive and direct influence on the TCM purchasing behavior of Chinese Medicine outpatients. However, "usable resources" was an important factor with direct influence on behavioral intention. When there were more usable resources, the behavioral intention became stronger and indirectly had influence on the TCM purchasing behavior. Furthermore, the analysis result of one-way ANOVA showed that the more chronic diseases the surveyed subject suffered, the more significant the influence on purchasing behavior became.

Conclusions: Under the current NHI system, patients with multiple chronic diseases are the major purchasers of TCM products not covered by NHI. Therefore, increasing the usable resources of TCM products for the patients with chronic diseases will help hospitals in developing TCM services under the current NHI system.

Introduction

Traditional medicine has a long history. In the last decade, the use of traditional medicine expanded globally and gained popularity. It is now not only used for primary health care of the poor in developing countries, but is also used in countries where conventional medicine is predominant in the national health care system.

Despite its existence, continuous use over many centuries, popularity, and extensive use during the last decade, traditional medicine has not been officially recognized in most countries. The terms complementary/alternative/nonconventional medicine are used interchangeably with traditional medicine in some countries. Unlike many other countries, Taiwan has included Traditional Chinese Medicine (TCM) or complementary and alternative medicine (CAM) in its Na-

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tional Health Insurance (NHI) system since 1995. However, the types of Chinese herbal medicine covered by the NHI are limited to extracted TCM powder preparations prescribed by TCM physicians. Patients are required to pay out of their own pocket for crude drugs and other TCM products produced according to traditional methods. For example, the decoction method (boiling several prescribed crude drugs down to make a Chinese medicinal soup) has been used for thousands of years, and has been proven effective for urgent/severe diseases and regulation of a patient's physical condition. In addition, there are also quite a few TCM products manufactured with modern technology, such as Chinese herb tea bags, pills, capsules, and ointments, which are effective and very convenient to use. However, they are not covered by the NHI, which hinders the application of TCM products. Therefore, Chinese Medicine hospitals or clinics usually encourage their patients to pay extra for TCM preparations not covered by NHI to increase their profit. This study investigated the factors influencing Chinese Medicine outpatients' purchasing behavior in order to facilitate the development of TCM services under the current NHI system in Taiwan.

According to Icek Ajzen's Theory of Planned Behavior, an individual's behavioral intention is the best variable predicting one's behavior. Behavioral intention refers to an individual's subjective probability to perform a certain behavior. The stronger the intention is, the higher the probability of performing the behavior will be. Attitude, subjective norms, and perceived behavioral control are three factors that can influence an individual's behavioral intention and further influence one's behavior. Subjective norms are perceptions of whether others approve of a person's certain behavior. Perceived behavioral control refers to people's belief in their ability to perform a behavior. When a person believes he/she has the ability and has more related resources and opportunities, his/her perceived behavioral control in performing the behavior will be stronger.[1–6] Andersen's Behavior Model of Health Service Utilization states that there are three factors influencing individual medical service utilization: a predisposing component, an enabling component, and a need component.[7,8] A predisposing component is the propensity of individuals to use medical services; it includes demographic traits, social structure, and health beliefs. An enabling component refers to the external resources enabling individuals to access medical care; it includes personal/family income, health care insurance, and accessibility of medical resources. A need component is defined as personal health needs. According to Liao et al., the general public's TCM-consuming behavior is influenced by individual health status and TCM utilization habits.[9] Although Andersen's Behavior Model is often used to explore the factors influencing the use of medical services, it focuses mostly on factors pertaining to individuals. Thus, in this study, we integrated Anderson's Behavior Model with Ajzen's Theory of Planned Behavior as a model to predict purchasing behavior of TCM outpatients. After integrating the aforementioned behavior theories and related studies, we constructed a research model consisting of five factors: "suffering from disease," "attitude toward TCM," "TCM knowledge," "people's influence," and "usable resources" (Fig. 1). We hypothetically assumed that the five factors would influence TCM outpatients' behavioral intention toward purchasing TCM and further influence their actual purchasing behavior. Of the five factors, "suffering from disease" and "usable resources" were hypothesized to have direct influence on purchasing behavior, and the term "usable resources" was defined as purchasing behavior-related resources, such as money, transportation, time, and medical institutes supplying TCM services not covered by NHI in the neighborhood. In this paper, we survey 645 patients who purchased TCM products to assess their purchasing behavior based on the model proposed above.

Materials and Methods

Data collection

Data were collected via questionnaires in two academic hospitals located in central Taiwan that provided Chinese
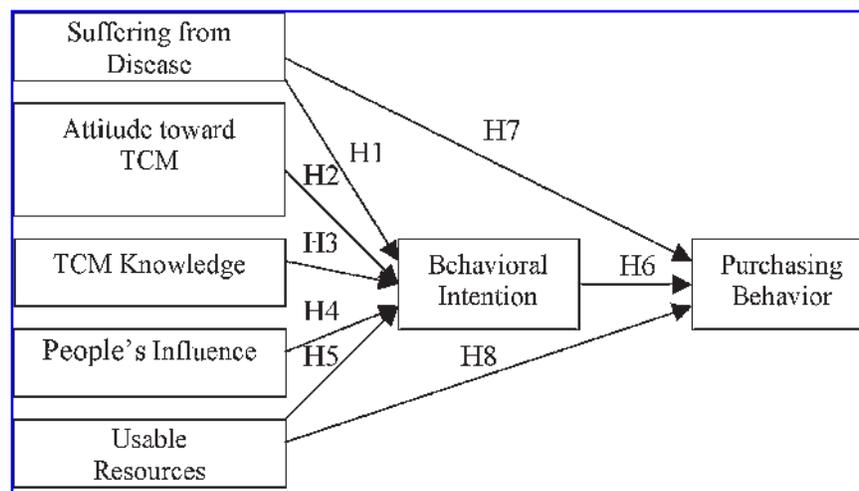
FIG. 1. The hypothesized path model. The five exogenous variables would influence two endogenous variables—"behavioral intention" and "purchasing behavior." H1–H5 and H6–H8 had influence on the path coefficients of behavioral intention and purchasing behavior, respectively. Path coefficients were used to assess the relative importance of various direct and indirect causal paths to the dependent variable.

TABLE 1. RESEARCH VARIABLES

Variable	Survey questions
Attitude toward TCM	TCM is more effective than Western medicine.
	TCM is good for health maintenance.
	TCM has fewer side-effects.
	TCM products not covered by NHI (self-support) are more effective.
	Extracted TCM powder preparations are safer.
People's influence	I am willing to accept any suggestion from the physician.
	I am encouraged by family members to purchase the TCM products not covered by NHI approved or suggested by the physicians.
	Family members or relatives have used TCM products not covered by NHI and received satisfactory results.
	Family members want me to purchase the TCM products not covered by NHI suggested by the physicians.
Usable resources	My family's financial situation allows me to purchase the TCM products not covered by NHI.
	For me, it is easy to make decoctions from traditional TCM herbs.
	I do not have time to make decoctions from traditional TCM herbs.
	It is not difficult for me to find a hospital (or clinic) offering TCM products not covered by NHI.
	As far as traffic is concerned, it is difficult for me to find a hospital (or clinic) offering TCM products not covered by NHI.
Suffering from disease	Number of outpatient visits during the last 12 months
	Number of hospitalizations during the last 12 months
	Number of chronic diseases suffered
	Suffering from old health problems
	Visiting the clinic for diseases suffering
TCM knowledge 1	The virtue of *Dong Quai* (Chinese angelica; *Angelica sinensis*) is to supplement the blood.
Herbs	The virtue of *Gou Gi Zi* (wolfberry; *Lycium chinensis*) is to improve eyesight.
	The use of TCM must take individual physical conditions into consideration.
	TCM herbs like *Hong Zao* (Chinese date; *Ziziphus jujuba*), *Huang Chi* (milk vetch; *Astragalus membranaceus*), *Gou Gi Zi*, etc. must be stored in the refrigerator to avoid deterioration.
	Pang Da Hai (sterculia seed; *Sterculia lychnophora*) can be used to cure hoarse voice and swollen throat.
TCM knowledge 2	TCM does not have-side effects.
Common sense about	TCM is the tonic only suitable for winter.
utilization	TCM tonics do not need to take individual physical conditions into special consideration.
	Sheng Hua Tang (tangkuei, ligusticum, persica, licorice, ginger) is good for both pregnant and postnatal women.
TCM knowledge 3	
Dosage forms	Chinese crude drugs (for making decoction) are made with ingredients from plants, animals, and minerals.
	So-called Modernized TCM is the extracted TCM powder preparations made out of Chinese crude drugs.
	The extracted TCM powder preparations is ready to be used and no cooking or stewing is needed.
Behavioral intention	If the physician suggests to me to purchase certain TCM products not covered by NHI, I am willing to buy it.
	When TCM is needed for medical therapy, I will consider buying TCM products not covered by NHI.
	I only consider the extracted TCM powder preparations covered by NHI and do not want to buy any TCM products not covered by NHI.
	If any of my family members needs to buy TCM products not covered by NHI, I will not be against it.
Purchasing behavior	Accept the physician's suggestion to buy TCM products not covered by NHI for curing diseases.
	Accept the physician's suggestion to use TCM products not covered by NHI for health maintaining.

TCM, Traditional Chinese Medicine; NHI, National Health Insurance.

Medicine outpatient services and offered extracted TCM powder preparations and other TCM products not covered by NHI. The questionnaires were administered to randomly selected outpatients in the waiting areas of the hospitals' TCM pharmacies. This study used confidence intervals to estimate sample size. Given significance level $\alpha = 0.05$, $Z = 1.96$, and tolerated error 0.05, and using the standard deviation 0.6248359 for the variable "behavioral intention" in the

pretest for the calculation, the sample size had to be greater than 600. The proportion and sample size were based on the number of outpatients receiving medicine from the two academic hospitals' pharmacies in the morning, afternoon, and evening. The samples were then selected according to the predetermined "next-in-line" number to receive medicine at the pharmacy. A random sample of 645 outpatients was recruited from August to September 2006.

A research assistant (interviewer) helped conduct the survey by approaching the selected outpatients waiting for medicine in the waiting area of the hospital TCM pharmacy, briefly explained the purpose of the study, and described the study procedures. An informed consent form offering legitimacy of data collection was given to every surveyed outpatient. The questionnaire, informed consent form, and survey method were approved by the China Medical University Hospital Institutional Review Board. All research assistants had to undergo related training. While the surveyed subjects completed the questionnaire, the assistants were not allowed to offer any answers or hints.

Instruments. We designed a structural, self-report questionnaire with three dimensions (demographic data, subject's viewpoints and personal experience, and TCM knowledge). Demographic data included age, gender, personal monthly income (1 = no income, 6 = >NT$100,000), education level (1 = elementary school and under, 5 = graduate school), suffering from severe disease (yes or no), number of chronic diseases suffered (1 = 0, 5 = >3), number of outpatient visits, including both Western medicine and TCM for the last 12 months (1 = 0, 4 = >10), number of hospitalization days during the last 12 months (1 = 0, 5 = >3), reason for receiving medicine (1 = chronic disease, 5 = others). The subject's viewpoints and personal experience about TCM were evaluated with a 14-item self-report measure containing three subscales. The three subscales included attitude toward TCM, people's influence, and usable resources (Table 1). Items were scored on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). In addition, a 7-item measure containing 2 subscales (behavioral intention and purchasing behavior) was answered according to the subject's actual conditions. Items were scored on a 5-point Likert scale ranging from never (1) to always (5). A 12-item measure containing 3 subscales (herbs, common sense about utilization, and dosage forms) was used to evaluate TCM knowledge (Table 1). The answer was in the form of "yes" or "no."

Validity and reliability. Content validity of the survey was measured through a panel discussion with well-experienced professors in the filed. The reliability of the context was measured based on the estimation of the internal consistency and homogeneity. The criterion of measuring the reliability was based on the Cronbach's α value. A Cronbach's α value larger than 0.7 indicated high reliability.[10]

Data analysis

SPSS 10.0 (Statistical Package for Social Sciences, Chicago, IL) was used to run descriptive analysis and analysis of variance (ANOVA). Descriptive statistics including means and standard deviations (SD) were calculated for all variables of the samples. One-way ANOVA was used to compare the variation of purchasing behavior between different demographic traits. In addition, LISREL 8.30 (Analytical Package, Scientific Software International, Inc., Chicago, IL) was used to modify and analyze the relationship between the variables of the hypothetical model. Any variable with missing information was omitted.

TABLE 2. CHARACTERISTICS OF SUBJECTS RECRUITED TO SURVEY OF OUTPATIENTS

Variable	n (%)
Sex	
Male	401 (62.85)
Female	237 (37.15)
Age (years) mean ± SD	40.17 ± 15.30
≤25	111 (17.59)
26–35	173 (27.42)
36–45	133 (21.08)
46–55	111 (17.59)
56–65	61 (9.67)
>65	42 (6.66)
Education	
Elementary school and under	41 (6.48)
Junior high	62 (9.79)
Senior high (vocational)	183 (28.91)
College or University	304 (48.03)
Graduate school	43 (6.79)
Personal income (NTD/month)	
No income	188 (31.49)
Under 20,000	80 (13.40)
20,000–39,000	190 (31.83)
40,000–59,000	88 (14.74)
60,000–100,000	34 (5.70)
Over 100,000	17 (2.85)
Suffering from severe diseases	
No	577 (91.59)
Yes	53 (8.41)
Number of chronic diseases suffered	
0	316 (50.40)
1	210 (33.49)
2	73 (11.64)
3	11 (1.75)
>3	17 (2.71)
Number of outpatient visit including both Western and TCM for the last 12 months	
0	42 (6.59)
1–5	211 (33.12)
6–10	125 (19.62)
>10	259 (40.66)
Number of hospitalization for the last 12 months	
0	512 (81.14)
1	78 (12.36)
2	20 (3.17)
3	9 (1.43)
>3	12 (1.90)
Reason for receiving medicine	
Chronic disease	224 (36.07)
Sudden illness	172 (27.70)
Nursing during recovery	63 (10.14)
Health maintenance	103 (16.59)
Others	59 (9.50)

NTD, New Taiwan Dollars (1 NTD = $0.0329 USD).

Results

Instruments

The pretest showed that the reliability coefficients for attitude toward TCM ($\alpha = 0.9012$), people's influence ($\alpha = 0.7768$), and usable resources ($\alpha = 0.9087$) were moderately acceptable. Following the pretest, the item difficulty index and item discrimination index of every TCM knowledge item were calculated. The items that did not reach the standard were deleted.

Demographic characteristics

In total, 645 questionnaires were collected. Of them, 641 were valid and 4 were not included due to excessive missing data. Most respondents were men (62.85%) and the mean age across all respondents was 40.17 years (SD = 15.30). Of the 641 respondents, 50.40% did not have chronic diseases; however, 40.66% respondents had more than 10 outpatient visits (including both Western and Chinese Medicine) during the last 12 months. The detailed characteristics of the subjects are listed in Table 2.

Pathway model

A total of 512 samples were analyzed. Five exogenous variables "suffering from disease," "attitude toward TCM," "TCM knowledge," "people's influence," and "usable resources" and two endogenous variables "behavioral intention" and "purchasing behavior" were used to construct the research model.

This research used the maximum likelihood method to conduct parameter estimation. Regarding the analysis of the entire model's goodness of fit, the value of χ^2/df was 2.42, goodness of fit index was 0.90, the adjusted goodness of fit index was 0.88, the normed fit index was 0.83, the root mean square error of approximation was 0.053 and the comparative fit index was 0.86. Each survey question's factor loading had an absolute value t greater than 2, which means the entire model's goodness of fit is good. The pathway model showed that "people's influence" and "usable resources" influenced behavioral intention (Table 3). The results of the pathway model constructed in this research are shown in Figure 2. Concerning the effect of influence, "usable resources" had the greatest total effect on "behavioral intention" and "behavioral intention" had a significant, direct effect as well as the greatest total effect on purchasing behavior (Table 4).

The influence of demographic variables on purchasing behavior

One-way ANOVA showed that "age," "education," "number of diseases suffered," and "reason for receiving medicine" significantly influenced purchasing behavior (Table 5). When purchasing behavior was compared between different age groups and education levels, we found that the average value of people older than 65 years was higher than that of people younger than 25 years of age and that the average value of people with low education (elementary school and under) was higher than that of people with high education (college or university). Furthermore, purchasing behavior was significantly influenced by the number of chronic diseases. Finally, suffering from chronic diseases had a higher value for receiving medicine than either sudden illness or health maintenance (Table 5).

Discussion

The results of this research show that behavioral intention has a positive, direct influence on purchasing behavior. In other words, improving patients' behavioral intention can stimulate their purchasing behavior. The factors "people's influence" and "usable resources" had a direct influence on behavioral intention.

Many people choose to use an alternative therapy because it has been referred by those who have used it and feel satisfied with the results. Referrals come mainly from family

TABLE 3.   EXAMINATION RESULTS OF THE HYPOTHESIZED PATH PARAMETERS

Path of parameter	Standardized regression coefficient	t-Value	Examination result of hypothesis
H1 Suffering from disease → Behavioral intention	0.12	1.72	Not established
H2 Attitude toward TCM → Behavioral intention	0.14	0.97	Not established
H3 TCM knowledge → Behavioral intention	−0.03	−0.47	Not established
H4 People's influence → Behavioral intention	0.30*	2.11	Established
H5 Usable resources → Behavioral intention	0.71***	5.33	Established
H6 Behavior intention → Purchasing behavior	0.67***	3.91	Established
H7 Suffering from disease → Purchasing behavior	0.24***	3.68	Established
H8 Usable resources → Purchasing behavior	−0.21	−1.15	Not established

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
TCM, Traditional Chinese Medicine.
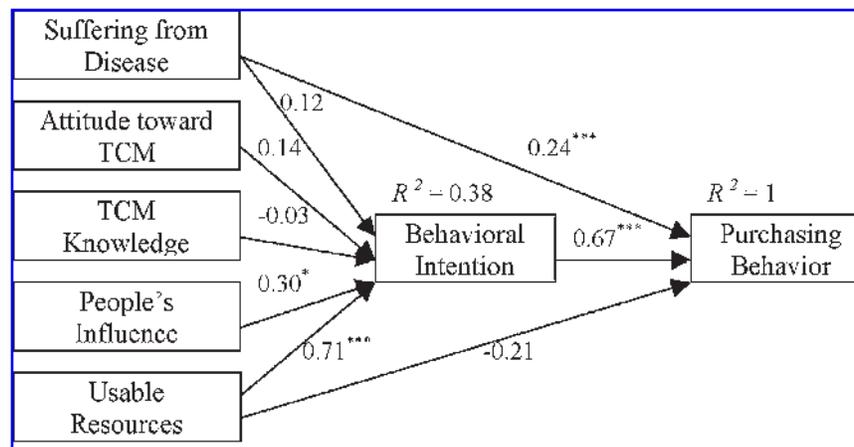
FIG. 2. The pathway diagram: "people's influence" and "usable resources" had influence on behavioral intention. "Suffering from disease" and "behavioral intention" had significant, positive, and direct influence on purchasing behavior. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

members, friends, acquaintances, and co-workers.[11] In addition, when an individual has more usable resources, such as money, time, convenience, and access to TCM, the individual's behavioral intention will be stronger. Previous studies have shown that income level is an important factor for people seeking alternative care.[12] According to a British research study, older people have fewer financial resources to pay for private complementary medicine (CM).[13] CM users tend to have middle to high incomes.[14] However, some research shows that most unconventional medical users are older people with higher income.[15–17] This research used one-way ANOVA to analyze the data collected from the surveyed subjects. The results also showed that older people purchase TCM products more often than young people; however, the influence of personal income on TCM purchasing behavior was not statistically significant. One possible reason that older people's income does not predict purchasing behavior was that the influence of usable resources on behavioral intention should take into consideration not only personal income but also the total family income and other various enabling components. For example, older people have more time and ability to make decoctions from TCM herbs than the young. Several decades ago, TCM was the main therapy in Taiwan, so most senior people have experience making

decoctions from TCM herbs; older people also tend to have more free time than younger people. Therefore, the TCM purchasing behavior of the elderly was higher than that of younger individuals.

The pathway model revealed that without "behavior intention," "suffering from disease" had a direct, positive influence on purchasing behavior. Many researchers have reported that demographic variables[15–20] and health factors[17,18,20] were significant factors influencing the use of CAM. For example, most CAM users[11,21–27] are patients with poor health status and/or chronic diseases. Some American researchers have also indicated that CAM users have a higher average number of annual outpatient visits compared with nonusers.[28] In this research, one-way ANOVA showed that the number of TCM outpatient visits during the past 12 months had no significant influence on TCM purchasing behavior. However, the more chronic diseases the surveyed subject suffered, the more significant the influence on purchasing behavior became.

Although the pathway model showed that TCM knowledge had a significant influence on behavioral intention, one-way ANOVA showed that the purchasing behavior of people with low education was higher than that of people with high education. This is because purchasing Traditional Chi-

TABLE 4. THE INFLUENCE OF EACH VARIABLE ON BEHAVIORAL INTENTION AND PURCHASING BEHAVIOR

Prediction variables	Behavioral intention			Purchasing behavior		
	Direct effect	Indirect effect	Total effect	Direct effect	Indirect effect	Total effect
Suffering from disease	0.12 (1.72)	—	0.12 (1.72)	0.24*** (3.68)	0.08 (1.61)	0.32*** (5.48)
Attitude toward TCM	0.14 (0.97)	—	0.14 (0.97)	—	0.09 (0.97)	0.09 (0.97)
TCM knowledge	−0.03 (−0.47)	—	−0.03 (−0.47)	—	−0.02 (−0.47)	−0.02 (−0.47)
People's influence	0.30* (2.11)	—	0.30* (2.11)	—	0.20* (2.10)	0.20* (2.10)
Usable resources	0.71*** (5.33)	—	0.71*** (5.33)	−0.21 (−1.15)	0.48** (2.87)	0.27** (3.38)
Behavioral intention				0.67*** (3.91)	—	0.67*** (3.91)

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Direct effect, indirect effect, and overall effect are standardized regression coefficients.
TCM, Traditional Chinese Medicine.

TABLE 5. ANALYSES OF VARIANCE ANALYSIS RESULTS OF DEMOGRAPHICS FEATURES AND PURCHASING BEHAVIOR

Demographics variables	Number of samples	Average	Standard deviation	Critical Value F	Scheffe's
Age (years)					
1 = under 25	109	2.2844	1.0305	4.796**	5 > 1
2 = 26–35	171	2.4211	0.9961		
3 = 36–45	129	2.5465	0.9570		
4 = 46–55	109	2.6193	1.0067		
5 = 56–65	55	2.8767	1.2142		
6 = over 65	38	3.0395	1.2860		
Education					
0 = Under elementary	39	2.7951	1.0854	4.006**	0 > 3
1 = Junior high	61	2.5169	1.1452		
2 = Senior high	178	2.4522	1.0097		
3 = College or University	293	2.4643	1.0417		
4 = Graduate school	42	2.5457	1.0382		
Personal income/month (in NTD)					
0 = No income	179	2.6117	1.1237	1.4297	
1 = under 20,000	78	2.3462	1.0010		
2 = 20,000–39,000	189	2.4762	1.0070		
3 = 40,000–59,000	86	2.5407	0.9977		
4 = 60,000–100,000	32	2.6094	1.1125		
5 = Over 100,000	15	3.0000	1.1339		
Number of outpatient visit during the last 12 months (including both Chinese and Western medicine)					
0 = 0 time	39	2.2564	0.8950	3.4001	
1 = 1–5 times	206	2.5170	1.0162		
2 = 6–10 times	123	2.4268	1.0533		
3 = over 10 times	249	2.7028	1.0953		
Total of chronic diseases					
0 = zero	311	2.4003	0.9893	5.980**	4 > 0
1 = one	201	2.6067	1.0605		4 > 1
2 = two diseases	69	2.7476	1.0901		
3 = three diseases	11	3.0455	1.2136		
4 = over three	15	3.4667	1.1872		
Reason for receiving medicine					
0 = chronic disease	215	2.8326	1.1106	7.814**	0 > 1
1 = sudden illness	168	2.4315	0.9818		0 > 3
2 = Nursing during recovery	61	2.5738	0.9697		0 > 4
3 = Health maintenance	103	2.3398	1.0030		
4 = Others	57	2.1491	0.9773		

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
NTD, New Taiwan Dollars (1 NTD = $0.0329 USD).

nese Medicines from the hospital pharmacy can only be done after a patient's condition has been diagnosed and the medicine has been prescribed by a TCM doctor. Therefore, an individual's knowledge had less influence on his/her purchasing behavior. As a result, TCM knowledge had less total effect on purchasing behavior than "suffering from disease."

Conclusions and Limitations

Under the current NHI system, as shown in Figure 2, patients with multiple chronic diseases are the major purchasers of TCM products not covered by the NHI. Furthermore, word-of-mouth recommendations have a significant influence on behavioral intention. Thus, physicians can, based on their medical expertise of the patient's condition, suggest that patients take TCM products not covered by NHI. If the TCM products are effective, patients will share their good experiences with family and friends. Therefore,

increasing the usable resources of TCM products for patients with chronic diseases will help hospitals in developing TCM services under the current NHI system.

One of the limitations of this study is that the subjects were randomly selected from only two academic hospitals in central Taiwan. Another limitation is that the form of the self-report questionnaire potentially reduced the number of senior subjects. However, the pathway model seems to provide preliminary prediction of the TCM purchasing behavior of hospital outpatients. It is expected that this research could lead to larger, more in-depth studies in the future.

Acknowledgments

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