Article

Reasons wWhy do people in Taiwan select the outpatient clinic of the medical center;? a nationwide analysis in Taiwan

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Abstract:

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 exploreevaluate the factors contributing to the patients' selection of the outpatient clinic of medical centers without a referral.

Methods. An online anonymous survey was conducted by using Google Form platform utilizing self-constructed questionnaire 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. The associations between items that affect the patients' choice of outpatient clinics were assessed using exploratory factor analysis. Principal axis factoring was performed to identify the major factors. Hierarchical logistic regression was conducted to determine which factors satisfactory explained "visiting the outpatient clinic of the medical center for an illness without a referral."

Results. During the survey period, 5060 people browsed the online survey, and 1003 responded and completed the online questionnaire. The response rate was 19.8% .A total of 987 valid responses was collected. In univariate analysis, "physicians are highly reputable", "physicians have a good medical practice", " the institution has advanced equipment", "the institution has high-quality drugs", "the institution has diverse specialties",and "the institutions with a good reputation" had the largest effect on patients' selection of an outpatient institution. 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. Ppatients 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 (OR 2.218, 95% CI: 1.514-3.24940.7%–134.1%). Patients who reported that the physician factors were very important were less likely to select the outpatient clinic of a medical center (OR 0.717, 95% CI: 0.523-0.9844.2%–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 0.5096, 95% CI: 0.4352–0.5952 and OR 0.6762, 95% CI: 0.47168–0.9694).

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. Ppatients with good primary medical experience and regular family physicians had significantly lower rates of selecting the outpatient clinic of a medical

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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: health care seeking behaviorprimary clinic; national health programsinsurance; hospital outpatient clinic; choice of medical institution; medical choice; healthcare survey ; single-payer system

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.

Hierarchical medical care means that medical resources can be used the most efficiently through professional division in the medical system. In most countries, primary care physicians act as healthcare “gatekeepers” by providing initial medical interventions and referring patients to additional specialists *(Yan, Kung & Lu, 2019)* (Yan et al. 2019). 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.

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 *(Lynn et al., 2015)* (Lynn et al. 2015). 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, Chen & Lin, 2019; Lee et al., 2018)*. (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 *(Wang & Lin, 2010)* (Wang & Lin 2010). 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 *(Lynn et al., 2015)*.(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, Majeed & Kuo, 2010)*. (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 *(Wang & Lin, 2010; Yip et al., 2019)* (Wang & Lin 2010; Yip et al. 2019) .

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)*. (Lee et al. 2018). The increment in the copayment had little effect on the population, making them more willing to visit primary clinics first *(Yang, Tsai & Tien, 2019)*. (Yang et al. 2019).

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)* (Cheng 2015). The main purpose of this study was to evaluate the factors contributing to the patients' selection of the outpatient clinic of medical centers without a referral. Only when we clearly understand

Further research is required to clarify the motives underlying the public's choice, then we could establish a successful graded medical system in Taiwan.

2. Materials and Methods

2.1. Study design

The present study washad a web-based cross-sectional online survey. The development and reporting of the survey followed the Checklist for Reporting Results of Internet E-survey (CHERRIES) guidelines (*(Eysenbach, 2004)*Eysenbach 2004). The checklist is available in the supplementary data. The questionnaire was developed in Google forms (https://www.google.com/forms/about/).

After the 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. By using the snowball sampling method, the questionnaire was introduced to a variety of community groups. To maximize public outreach, the survey was promoted in different social media such as Facebook, Line and the most popular bulletin board system (https://facebook.com/; https://linecorp.com/; and https://www.ptt.cc/index.bbs.html) with interested citizens being invited to complete the questionnaire and the respondents who took the survey being asked to continue inviting their friends to participate in the survey and fill out the questionnaire.

The link to the survey was available for a period of 8 weeks. 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. No rewards were provided to participants. 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)*.(Bowen et al. 2008).

This study was approved by the Institutional Review Board of Taipei Veterans General Hospital (2017-07-009AC) , and the study was conducted in accordance with the guideline of Helsinki declaration 2013.

2.2. Questionnaire design

Because there was no similar questionnaire related to the selection of outpatient clinics, we developed our own questionnaire, finalized after experts were invited to review and revise. A

literature search was performed for publications that discuss the factors affecting the outpatient choice. Search terms used were " health care seeking behavior ", " hospital outpatient clinics" and a combination thereof. Based on the factors identified by the literature search, we invited two family physicians, three outpatient nurses and five volunteers to participate in the focus group. The main topic was "What are the important factors in one's selection of an outpatient clinic when patients were ill?" The opinions provided by the experts are used as reference for the questionnaire.

Based on a literature review and the focus group, factors that related to the outpatient choice were proposed and included in the questionnaire. 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 was included. ~~The survey questions were formatted as short answer, single choice, or Likert rating scale questions.~~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. Five experts with expertise in subject content were invited to modify the questionnaire for ensuring content validity. Questions were refined after feedback and finalized into the online survey.

2.3 Reliability and validity analysis

The content of this questionnaire was obtained through the literature review and a focus group. Five senior researchers, who were expert in research, were invited to perform repeated questionnaire testing and discuss the entire instrument for content validity. The content was rated by five experts, resulting in a mean content validity index (CVI) of 86.0%.

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.

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2.4 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. The normality of the collected data was analyzed by the Kolmogorov-Smirnov test. As the data follow the normal distribution, comparisons between three groups were conducted by an analysis of variance (ANOVA).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 (0.868) and Bartlett's Test of Sphericity (significance <0.0001) show that factor analysis can be applied. Principal axis factoring was performed to identify the major factors by using a correlation matrix and oblimin rotation. The number of principal components to be extracted was determined by examining the eigenvalues (>1). Loadings over 0.5 were used to interpret components in the study was set at 0.5. Finally, the number of domains was reduced to three and named 'physician factor' , 'image & reputation factor'and 'facility & medication factor'. Internal consistency was demonstrated, with the Cronbach's α coefficient ranging from 0.792 to 0.905 for the factors. These three factors accounted for 61.7% of the total variance of the variables.

Hierarchical 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 adjusted odds ratios (ORs) with 95% confidence intervals (CIs) for predicting "visit to an outpatient clinic of the medical center for an illness" were computed. In model 1, the association of age, gender and personal experience of primary clinics were tested. The physician factor, image and reputation factor, and facility and medication factor were added in model 2 to test the associations beyond the personal factors. The other variables were added in model 3 to test the associations of sociodemographic factors beyond above factors.

To ensure the security of the data, all data were stored on a secure server, and were backed up on a local hard disk. Only the researcher could access these materials.

Data were primarily evaluated by Dr. Lin, Ming-Hwai. The survey data were extracted into Excel (Microsoft Corp) and the statistical analysis was performed with the Statistical Package for the Social Sciences (SPSS, version 20.0; SPSS Inc., Chicago, IL, USA).

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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.

The mean age of the respondents was 43.6 (SD 10.6, minimum age 19, maximum 85 years). 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 without 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. In univariate analysis, tThe 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 average rating associations between the numbers of respondents to each factor when selectingwho rated a factor as “important” in the selection of an outpatient facility and their preferred outpatient institution. "Physicians were highly reputable" , "physicians explained in detail", and "physicians have a good medical practice" were the most important factors to consider when choosing the outpatient institution. Low copayment is the least important factor for outpatient medical choice among all patients (the average rating of Likert scale : 3.08 ± 1.16).

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In univariate analysis, the importance of six factors was significantly higher among the respondents who chose to visit a medical center ($p < 0.0015$). These factors were "physicians are highly reputable", "physicians have a good medical practice", " the institution has advanced equipment", "the institution has high-quality drugs", "the institution has diverse specialties",and "the institutions with a good reputation". 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 less then of 0.0010 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 multivariablete 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 2.89% for every additional year of age (95% CI: 1.67%–4.1%) when other variables were controlled for. Patients who were previously satisfied with the medical experience of primary clinics had a 0.5096 lower likelihood of choosing a medical center to visit when ill (95% CI: 0.4352–0.5952). Patients who rated copayment as important were 0.5235 times as likely to select a medical center to visit when ill (95% CI: 0.35460–0.78196). People with a regular family doctor were 0.6762 times less likely to select a medical center (95% CI: 0.47168–0.9694). Patients who rated the image and reputation of the hospitalphysician factor as very important were less28% more likely to select an outpatient clinic in a medical center when they were ill (OR 0.717, 95% CI: 0.523-0.9844.2%–57.4%). Patients who reported that hospital facilities, high-quality drugs, and diverse specialties as very important had an 81.5% increased likelihood

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of selecting the outpatient clinic of the medical center (OR 2.218, 95% CI: 1.514-3.24995% CI: 40.7%–134.1%).

4. Discussion

Several factors significantly affected the selection of the medical center, including older age, the physician factor, advanced equipment, high-quality drugs, good reputation and visibility, and diversity of specialists. In Taiwan, more subjects agreed to the hierarchical medical system and medical referral system, but many people still disagreed with changes to their healthcare seeking choices due to policy promotion *(Yan, Kung & Lu, 2019)*.(Yan et al. 2019) Previous survey found that age, gender, residence, education and monthly family income are significantly related to inpatient hospital choice *(Kamra, Singh & De, 2016)*.(Kamra et al. 2016) Some results are consisted to ours. However, in our study, income did not have obvious impact on outpatient choice. The may due to the exemption for low-income people in Taiwan's health insurance. When they visit the medical center without a referral, they don't have to pay any component *(Yang, Tsai & Tien, 2019)*. (Yang et al. 2019)

It has been more than 20 years since the introduction of the family physician in Taiwan, but only 51.5% of the respondents have regular family doctors. In this study, patients with regular family doctors, who were satisfied with the past medical experience in primary care , and who rated the physician factor as important, and who rated copayment as important, were less likely to choose a medical center when ill. Such results show that the implementation of the family physician system, so that the public generally has a trusted family doctor will help reduce the number of patients directly to the medical center without a referral.

Gender, marital status, and education level did not affect the choice of outpatient visits. In univariate analysis, the choice of the outpatient institution was only slightly related to the income level, and the income level was no related to the outpatient choice when other variables were controlled for in regression analyses. Low copayment is the least important factor for outpatient medical choice among all patients. This result 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 *(Chen & Fan, 2015)*. (Chen & Fan 2015). ~~The insurance system is fee-for-service in Taiwan. People who visit~~

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~~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). 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.

In the present research, a similar phenomenon was also observed. Low copayment has the lowest average rating of Likert scale when considering the importance of outpatient medical choice among all patients. 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)*(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. Liu's research in 2012 pointed out that different health profiles of elderly people on the likelihood of utilization and expenditure on health care services were significant. The high comorbidity group tended to utilize more services in the ambulatory care and the frail group had higher health care expenditures *(Liu, Tian & Yao, 2012)* (Liu et al. 2012). Our research results could not be found to be related to such findings. Requires the design of further studies to understand whether the primary clinics in Taiwan meet the needs of the elderly.

This study has several limitations which impact its findings.. First, given the web-based survey design, participants were recruited over the internet, the low response rate deserved further exploration. Although the online survey represents a wide age range and geographic distribution, this sample is generally younger and more highly educated *(Tengilimoglu et al., 2017)*. (Tengilimoglu et al. 2017). Hsieh found that Internet use in Taiwan was significantly associated with more outpatient clinic visits for those with chronic diseases *(Hsieh et al., 2016)*; (Hsieh et al. 2016); thus, the results should be generalized with caution. Second, the variance explained by the logistic regression model suggests that other significant factors may determine outpatient clinic decisions *(Cheng, 2015; Yip et al., 2019)*. (Cheng 2015; Yip et al. 2019).

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Despite these limitations, this study is the first to investigate how the public 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.

Acknowledgments

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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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