

## The Effect of Access and out of Pocket Payment on the Utilization of Physicians services

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**Abstract:** *Introduction* Physicians visit can be considered as one of the efficient ways in order to decrease the medical expenditure for people who are seeking for suitable treatments. This study aims to examine the effect of some potential factors on the utilization of Iranian Social Security Organization (SSO) insured from the specialists (SP) visit in private sector. *Methods* The data was collected from the databases of SSO Electronic Medical Records and its healthcare centers located in the 28 provinces between years 1998- 2009. The research population included all the insured of the SSO visited by the specialists in the private, public and SSO-affiliated health facilities in given period. We analyzed the data using linear fixed-effects models. *Results* We found the geographical access, out of pocket (OOP) payment for medication and utilization of general practitioners (GP) has direct effect on the utilization of specialists visit. On the other hand, visiting specialists in the SSO, the OOP payment for physicians' Specialist visit and ageing had a reverse effect. In addition, the utilization from the specialists' visit services was not affected by the households' income. *Conclusions* This study could claim that both geographical access and OOP were influential in utilizing the physicians' visit services. Given the dissimilar facilities and provincial circumstances, the SSO is advised to make the situation equitable for conducive utilization of specialists services by the insured via choosing different combinations of medical services (private, public or free) proportionate with their insured and provincial conditions.

**Key words:** Visit • Out Of Pocket • Access • Utilization

### INTRODUCTION

Three key factors of direct payments for medical care, people income and geographical access to the care are believed to play an important role in their health status and be the main reason for the utilization or disuse of health care in developing countries [1]. The significance of these elements could be more apparent when their effect is separately studied in the circumstances of each society and for each service [2].

Most of these studies have been conducted in the USA and by RAND research institute which has calculated elasticity of demand for various medical services covered by diverse types of insurance since 1970 [3, 4]. The calculations of the Institute indicated that those contributing up to 25% to medical costs (cost-sharing) had out-of-pocket (OOP) price elasticity of -0.17 and those with a copayment between 25-95% were of a OOP price elasticity of -0.22 [5]. As such, other studies found a range of price elasticity between -0.04 to -0.75 for

medical services [6]. As these studies signify, the visit rate might vary dependent on the different circumstances such as various income groups and medical services.

Outpatient visit to physicians (OVP) is one of the key medical services which investigation of its utilization under various elements is of prominent importance, as it is the entry into the use of other services [7]. In low-income countries and for poor people, a visit to physicians and outpatient services is a cost-effective way for receiving primary care which could reduce the undue costs and unnecessary visits to higher levels, ultimately cutting the needless hospitalization [8].

Accordingly, this study aims to look into the effect of patients' OOP payment, income, retirement status and geographical access to care on their utilization rate from the specialists' outpatient services in private sector. It is a time-series study which is conducted at national and provincial level. Similar evidence was scant among developing countries with none found in Iran. The results are expected to assist the country's Social Security Organization (SSO) in underlining the importance of influential elements in utilizing the services in different provinces. As such, drawing on the results, the SSO also can make the situation conducive to the equitable utilization of specialist services by the insured through creating an appropriate combination of public, private and free of charge providers.

**Social Security Organization:** Providing a 42% insurance coverage (for 30 million people), the SSO is the Iranian largest insurance organization, pursuing two main objectives, i.e., having a healthy population and apt utilization of medical care [9]. Besides purchasing medical services from 47,000 private and public healthcare organizations (HCOs) via contracting out (ie, indirect treatment practice), the SSO also provides free of charge services in its own 70 hospitals and 280 clinics (ie, direct treatment practice) nationwide.

In the SSO, the insured are able to use secondary and tertiary level medical services in all sectors without going through referral system. The figure 1 illustrates the all providers of specialist outpatient services in the SSO in terms of different tariffs. Fee-for-service (FFS) payment system is used to pay the specialists by the SSO. Utilization of services by the insured is in the following ways depending on the HCO providing the services:

- Medical services provided by the SSO- affiliated HCOs are *free of charge* for the insured.
- The insured and the SSO pay 30% and 70% of the costs, respectively, in public HCOs.
- In private HCOs, the SSO pays the 70% of the public tariff and the rest is on the insured themselves (ie, they must pay the difference of tariffs in public and private sectors in addition to the remaining 30%).

## MATERIALS AND METHODS

In current research, the analyses were undertaken on the basis of 12-year panel data (from 1998- 2009) collected from the databases of the SSO Electronic Medical Records and its HCOs in 28 provinces (two provinces were excluded because of their incomplete data). Research population included all people insured by the SSO. The variables of the study include:

### Dependent Variable:

- Average number of insured visits to specialists in private sector ( $U_{SP1}$ )

### Independent Variables:

- The OOP payment of patients for each specialist's visit ( $OOP_{SP}$ )
- The OOP payment of patients for medication ( $OOP_M$ )

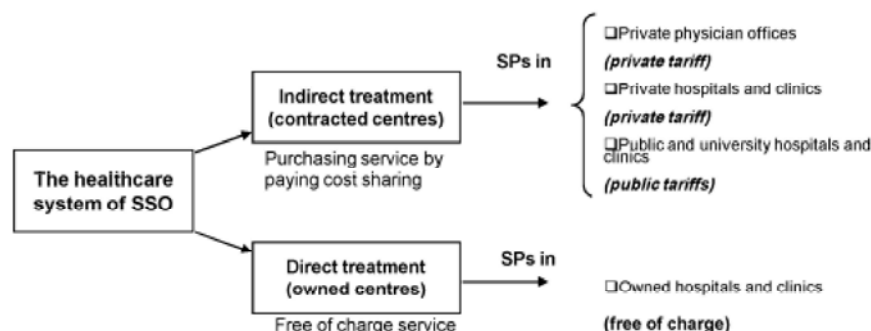


Fig. 1: The pathways and tariffs of specialist medical services provision in the SSO

- The geographical access to specialists in private sector ( $A_{SP}$ )
- The average *per capita* income of each household member ( $H$ )
- The ratio of pensioners to all insured ( $Ag$ )
- The average visit to specialists in SSO- affiliated HCOs ( $U_{SP2}$ )

In addition, patients' OOP for each GP's visit ( $OOP_{GP}$ ) and the average number of insured visits to GPs in private sector ( $U_{GP1}$ ) and SSO-affiliated HCOs ( $U_{GP2}$ ) were inputted into the model as substitute or complementary services for visiting specialist. The  $OOP_{GP}$  and  $U_{GP1}$  variables were multiplied by each other and inputted as one variable in the model because of the collinearity probability.

The geographical access and *per capita* income of each household member were calculated as follow: The access was obtained by calculating the proportion of contracted physicians in private sector to the insured population. For household income, we used instead the annual household cost published by Iranian Statistical Center (ISC), in view of its higher accuracy and correctness as compared to the income[10]. Owing to the high standard deviation of household size in provinces, the annual cost of households was divided by the average number of household members at each year, in order to acquire the adjusted per capita cost of each member of household per year. Also patient's OOP in private and public section obtained by reducing the share of SSO. Meanwhile, all costs were adjusted by consumer price index (CPI).

**The Model:** Panel data were used in this study. It was necessary that we defined a dummy variable ( $D_{it}$ ) for each province and then on the basis of this variable, we entered  $D_{it}X_{it}$  as a new variable for each province. In conclusion, the demand function of specialist visit across the provinces and over time was estimated using panel data and by two-sided logarithmic regression model (Double-log) considering fixed effects as follows:

$$\ln(U_{SP1}^{it}) = \beta_{10} + \beta_1 \ln(OOP_{SP1}^{it}) + \beta_2 \ln(OOP_M^{it}) + \beta_3 \ln(A_{it}) + \beta_4 \ln(H_{it}) + \beta_5 \ln(Ag_{it}) + \beta_6 \ln(U_{SP2}^{it}) + \beta_7 \ln(OOP_{GP1}^{it} \times U_{GP1}^{it}) + \beta_8 \ln(U_{GP2}^{it}) + \varepsilon_{it}$$

Where, 'i' is the indicator for the cross-section dimension of the data (provinces) and 't' representing time dimension of the data. All  $\beta$ s are a symbol for coefficients of the independent variables. In the standard case,  $\varepsilon_{it}$  is assumed to be independently and identically distributed over individuals and time, with mean zero and variance  $\sigma^2_{\varepsilon}$ .  $\beta_{10}$  is individual effects and constant over time. Because a double-sided logarithmic model has been used in current study, the coefficients ( $\beta$ ), of each variable can be interpreted as the variable elasticity. Eviews7 software was used to run the model.

## RESULTS

**Utilization of Specialists Visit:** Table 1 illustrates the average visit of the SSO insured to public, private and SSO centers and their share in providing specialist visit services during the period between 1998 to 2009. As in the table, overall, the average insured visit to the specialists in all three sectors has risen from 1.19 visit in 1998 to 1.88 in 2009, an absolute growth of 0.69. The average visit in terms of different providers shows that the highest growth was in order in private (0.35), public (0.26) and SSO-affiliated centers (0.08). In addition, during these years the public sector share of specialist visit has been of a 8% increase, whilst that of private and the SSO centers has decreased to 2% and 6%, respectively. The figure 2 displays the average trend of the insured visit to the specialists in each sector during the given period. Our aim in this study was to examine the factors influencing the fluctuations of the insured visit to specialists in private sector, constituting more than half of the visits (55%). As the figure shows, the average trend of the insured visit to private sector is of more fluctuations relative to other sectors. The strongest fluctuation has occurred in 2000 and 2003 onward.

Table 1: The average visit number of the SSO insured to public, private and SSO centers and the share of sectors

Providers	The average number of visits per insured		
	1998	2009	Change
Private sector in contract (private tariff)	0.67(56%)	1.02(54%)	0.35(-2%)
Public sector in contract (public tariff)	0.20(17%)	0.46(25%)	0.26(8%)
SSO- affiliated healthcare centers (free)	0.32(27%)	0.40(21%)	0.08(-6%)
Total	1.19(100%)	1.88(100%)	0.69(0%)

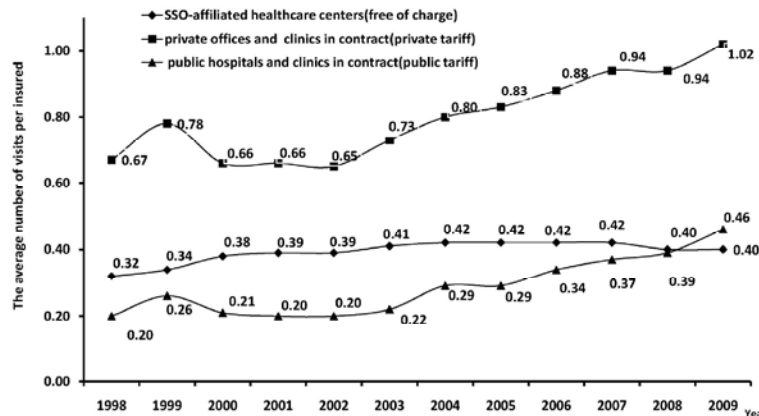


Fig. 2: The average of visiting a SP among the SSO's insured by each provider between 1998 and 2009

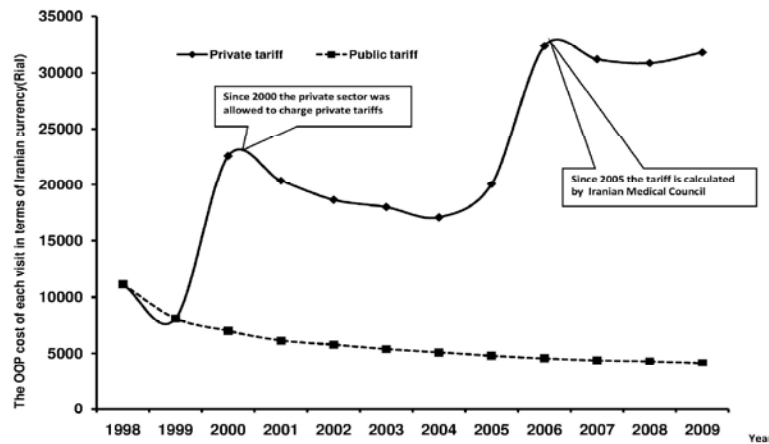


Fig. 3: The trend of public and private specialists' OOP between years 1998-2009

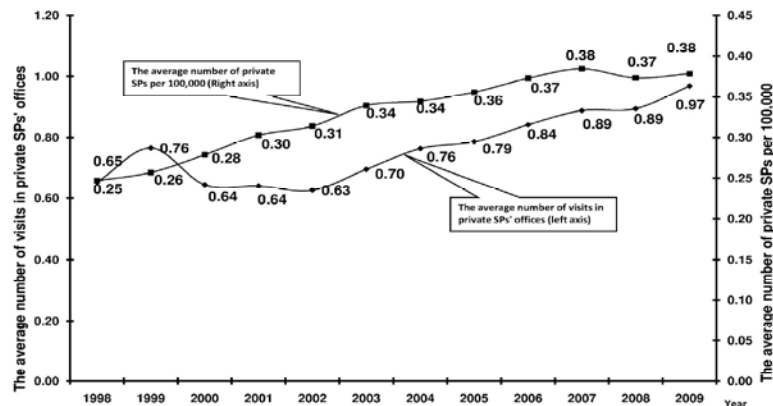


Fig. 4: The trend of patients' access to a private SPs and average utilization between years 1998-2009

**OOP of Specialist Visit:** The Figure 3 demonstrates the OOP of specialist visits in the public and private sector after their adjustment on the basis of CPI index. The findings show that on average the annual growth of specialists' OOP has been -8% and 18% respectively in public and private sectors.

An investigation into the specialist visit utilization revealed that up to 1999, public tariff was paid for medical services by the SSO's insured in both public and private services and patients' OOP was equal in both sectors[11]. Since 2000 the private sector was allowed to charge private tariffs, due to low public tariffs, resulted from

political matters and non-attendance to unit cost of the services in public tariffs[12]. After 2000 as before the SSO only paid 70% of the public tariffs to private HCOs and the rest was burdened by the patients. Consequently, there emerged a gap between patients' OOP in public and private sector. This gap worsened in 2004 and 2005 when tariffing private services, which was the onus of the Ministry of Health, found new incumbent, that is, Iranian Medical Council, an independent and private organization of physician guild. This association accelerated the growth of private tariffs as opposed to public tariffs in a way that the OOP proportion of specialist visit in private sector was 7.7 times over that in public sector in 2009. Therefore, as the figure 4 exhibits, the changes in the utilization rate in 2000 could be affected by the fluctuations in the tariffs. However, as is elucidated later, the improvement in the geographical access (and reduced indirect OOP, as a result) has somehow lessened the pressure on the insured, emanated from the increased direct OOP after 2005.

**Geographical Access to Specialists:** Figure 4 displays the insured geographical access to specialists in private sector. As the figure shows, the geographical access to specialists in this sector has increased from 25 physicians (in proportion to 100, 000 insured) in 1998 to 38 in 2003. The findings indicate that the insured geographical access to the physicians of private sector in 2009 was 3 times as much as that in public sector and 4.3 times in SSO-affiliated HCOs. Moreover, the figure also explicitly demonstrates the relationship of access to specialists in private sector and the average utilization of their visit services.

According to the figure, although the geographical access has been improving over the study years, the sudden introduction of private tariff in 2000 to private sector has extremely lessened the utilization. It seems the shocks caused by increased patients' OOP in 2000, because of better geographical access to the specialists, not only has diminished the utilization, but also, given the reduced indirect OOP of the patients (eg, low travelling and opportunity cost), has gradually boosted the utilization after 2000.

**OOP Payment of Prescriptions:** All around the country, a unique tariff is set for medication both in public and private sectors. The SSO's insured are not as such an exception and pay only 30% of each prescription plus

dispensing fee at both sectors. Since the average cost of medications prescribed by specialists is high, their procurement by patients could be costly without an insurance support. In addition, the cost of procuring medication without physicians' prescription and insurance support is also too high. The prescriptions in the SSO-affiliated HCOs are free for the insured. However, due to the restrictions (eg, limit on the number, amount and cost of medicines prescribed, imperative to use generic medication), their number and types are overly confined as compared to the medications prescribed in public and private sectors.

#### **Complementarity and Replaceability of GP and Specialist Services:**

In this study we used the average visit of the insured to the specialists in the SSO-affiliated HCOs as substitute service of physicians visit in private sector. In other words, as some people might not be able to afford to use private services, they receive these services from SSO-affiliated HCOs free of charge. Given the low number of SSO-affiliated HCOs, all the insured are not able to access to these organizations. In addition, given the replaceability and complementarity of GP and specialists services in various circumstances, the researchers considered the average visit to GPs in both SSO-affiliated (free of charge) and the rest as the substitute or complementary good for specialists in private sector in the study.

**Other Factors:** Annual household income and ratio of pensioners to all population, as other factors were considered in this study. The findings revealed that the average annual growth of Annual household income has been 2.2%. In other words, it has been overly insignificant as compared to that of medical tariffs in private sector. Also, The ratio of pensioners to all population increased from 8.88% in 1998 to 9.46% in 2009 among the SSO-insured population over the study years.

**Model Fitting Results:** The results, as in the table 2, show that the patient OOP for and utilization of physicians' visit service were reversely related in that a 100% increase in patient OOP for each specialist visit led into 36% reduction in visit to the specialists in private sector. However, there was a direct and significant relationship between geographical access and the visit to specialists, that is, a 100% increase in the access resulted in 20% rise in the utilization rate of physicians in the private sector.

Table 2: The estimation results of the model's parameters using panel data analysis

Variables	B	P-Value
The OOP payment of patients for each specialist's visit	-0.386	0.000
The geographical access to specialists	0.204	0.050
The OOP payment of patients for medication	0.195	0.004
The average per capita income	-0.027	0.780
The ratio of pensioners to all insured	-0.331	0.000
The average visit to specialists in SSO-affiliated	-0.082	0.020
The average number of insurees' visits to GPs in private $\times$ patients' OOP for each GP's visit	0.451	0.000
The average visit to GP in SSO-affiliated	0.294	0.000

The effect of variations in patient OOP for medication on the visit to specialists in private sector was direct and significant in a way that 100% increase in OOP for medication gave rise to a 20% increase in the utilization of specialists' visit services. Nevertheless, the proportion of pensioners negatively affected the visit to the specialists, namely, a 100% increase in the pensioners ratio caused a 33% reduction in the utilization of these specialists in private sector.

The findings also indicated that visiting specialists in the SSO-affiliated HCOs served as a substitute for this service in the private sector, as a 100% increase in the visit to the SSO facilities brought about 8% reduction in the use of specialists in the private sector. However, the minor effect was because of the few number of SSO-affiliated HCOs and, accordingly, the insured limited geographical access to them in terms of specialist services. In addition, this model strongly supports a direct and significant relationship between the visit to GPs and specialists. In fact, a 100% increase in the insured utilization from GP services, either in the private or SSO-affiliated HCOs, resulted in 45% and 25% growth, respectively, in the utilization of specialists' visit services in the private sector. Considering that GP visit service is a substitute for specialists', the interpretation of the finding could be simple. The per capita household cost was only variable whose effect on the utilization of GPs' visit services was insignificant in private sector.

**The Effect of OOP and Access (On Specialists Visit) in Provinces:** The study showed there was no fair access to the specialists in all provinces. For example, in 2009, the proportion of the highest to lowest access to specialists was 5.1 times in all provinces. Given the similar rate of patient OOP for SP visit services in all provinces, the proportion of the highest to lowest utilization rate from the specialists in private sector was approximately 3.2 times in all provinces in 2009.

Due to the inappropriate distribution of SSO-affiliated facilities in all provinces and the significant effect of variables OOP for visit and geographical access on utilization rate, the variables' coefficient was separately measured for all provinces. The results showed that the effect of OOP on utilization in different provinces ranged from minus 0.25 to minus 0.59 (SD= 0.10) and the strongest effect reported in Hamedan, Zanjan, Semnan, Yazd, Kermanshah and Isfahan. In addition, the effect of geographical access on utilization rate varied from 0.11 to 0.79 (SD=0.21) and the highest effect pertained to the provinces of Qom, Busheher, Gilan, Fars, Khorasan-Razavi. According to the findings, the different provinces showed disparate sensitivity to the variables.

## DISCUSSION

In the SSO's health system, the insured could utilize specialists' visit services in the SSO-affiliated health facilities free of charge and use that in public and private sectors by contributing to the cost (eg, copayments). Given the patients' high direct OOP in private HCOs as compared to the public and SSO-affiliated organizations, it was expected that the visit to private HCOs diminish [13] and the insured choose to first visit free HCOs (i.e. SSO-affiliated) and then public ones instead of going to the private centers. The results, however, were not as expected. The private, public and then the SSO-affiliated facilities were respectively visited most by the insured, according to the findings.

The results revealed that the price elasticity of OOP for the insured' utilization from specialists visit was minus 0.386 in private sector. Therefore, given the range of price elasticities in different studies (-0.04 to -0.75), comparing the elasticity of OOP with the findings of others seem to be irrational in view of the circumstances of the study, the characteristics of research society and the type of medical service [6].

The insured price elasticity for given variable was affected by several factors. First, a large part of specialists visit cost in private sector was paid by patients who pay high OOP (around 76% in 2009), resulting in stronger elasticity for this service. Second, with other options such as public and SSO-affiliated bodies (complimentary services) which have low OOP, this is expected that the elasticity becomes remarkably stronger. Therefore, the visits to private sector specialists rose during the study time; due to the lack of appropriate access to public and SSO-affiliated facilities as compared to private sector; given perceived high quality of services, freedom in choosing physician, short distance and waiting lists in private sector [14].

The findings showed that the insured access to physicians in private sector was two times as many as that in public sector and six times in the SSO-affiliated facilities. As such, a direct relationship between geographical access to services and utilization has been reported in the literature [15]. Therefore, although the cost of visit services and medication is very low for the patient in public and SSO-affiliated centers, as Kavooosi and colleagues point out, the patient mainly preferred to visit privately run HCOs to avoid high travelling and opportunity cost of public and SSO-affiliated organizations [16]. In fact, the unit cost of utilizing the specialists' visit services in private sector for those with appropriate access to these services was much less than what apparently expected. The SSO is able to use access variable as a tool for lessening the insured OOP. As the reimbursement to the physicians is on the basis of fee-for-service system, increased number of the private contracted physicians, irrespective of their appropriate distribution, might by itself make the situation conducive to the creation of induced demand by physicians and the greater number of visits, accordingly [17].

Iran is a large country with 30 provinces. If demographic features and the distribution of health resources and facilities are not matched with the circumstances peculiar to each province, the people utilization will be severely affected in each province. The analysis of two significant variables, i.e. the geographical access and OOP for visit, exposed their varying degree of effect in different provinces. As per the findings, the main cause of this difference was disproportional access to specialists in the provinces. In provinces with poor access, the utilization was also low. Therefore, an increase in the access could influence their utilization. In addition, in the economically disadvantaged provinces,

not only the lack of physical access, but high direct OOP of patients has negatively affected their utilization. The result has been the 2.6 times utilization in enjoying physicians services in some provinces. Therefore, proportioning the utilization rate in terms of the geographical access could be a part of practical requirements for equity in utilization in the provinces.

As approximately 60-75% of visits to physicians end up often with prescription of medication, the prescriptions are *defacto* an important output of the visits [18, 19]. Therefore, the patients' utilization from visits might be rationally affected by this variable, when the cost of medication rises. Our results showed that the increase of OOP for medicine has driven the growth in utilizing specialists visit. The researchers are not claiming that the medication and specialists visits are complimentary. Since the medication prescribed by the specialists might be expensive and could be costly without the SSO support, this possibility exists that the increase in the price of medicine has forced the insured to visit the specialists in order to obtain their medication through specialists' prescription. In such situations, the patients only pay 30% of the medication cost. Accordingly, the utilization rate of specialists visit could seemingly go up with rise of OOP for medication. The second less probable reason is that the rise of medication costs might constrain the access to medicine, making the diseases more severe and ultimately increases the number of visits to specialists [20].

The effect of increase in the pensioners proportion (relative to the population insured by the SSO) on the utilization of specialists' visit services in private sector was another issue under consideration. Although, the researchers expected that following this increase, a sign of aging *per se*, utilization of specialists visit services rises [21], the reverse occurred in the model. The reason might be that the pensioners' earning has fallen after their retirement along with their higher health costs because of aging. Accordingly, both because of the foregoing reasons and the pensioners' sufficient free time, it seems economic they receive most part of their medical services from the public and SSO-affiliated facilities.

Notwithstanding various studies indicating that household income (cost) is also effective in utilizing medical services [22], in accord with the results of current study, the effect of *per capita* household cost on utilization of specialists' visit services was insignificant in private sector. As Hotchkiss has similarly argued, the researchers found that the effect of income on utilizing

(specialists) outpatient services, as compared to inpatient and more costly, complicated services, was overly low [23]. Moreover, the importance and necessity of specialists visits in treating patients in private sector is so high that the role of income is ignored. As such, the lack of appropriate substitute for specialist services in other sectors (i.e. public and SSO-affiliated HCOs), both in terms of access and quality, has dragged the patients toward private sector. As shown, although the specialists' visit services in the SSO-affiliated facilities could have been a substitute for private sector, this relationship was not that strong in the equation.

In addition, the analytic model showed that there was a direct relationship between a visit to GP and specialist in the contracted private HCOs in a way that any increase or decrease in the visit to GPs has prompted a similar effect on utilization of specialists' visit services. Such a situation indicates that although there is no referral system for utilizing health services, if these two services (GPs and specialists) are seen as complementary to each other, the increase and decrease in utilization of GPs' visit could culminate in utilizing specialists visit [24]. In fact, this issue emphasizes the importance of GPs in utilizing the secondary and tertiary services.

The study obtained valid data from accurate databases. However, as a limitation of study, some data regarding utilization rate in terms of the insured age, gender, education and health status could improve the accuracy of our analyses. Such data did not exist separately for each province for 12 years at national level. Moreover, the effect of variables could vary contingent on utilizing different specialties which was impossible to record in current study because of the lack of access to data on separate utilization in various specialties of physicians; deemed as another limitation of the study.

## CONCLUSION

The study de facto looked into the effect of foregoing elements (ie, access) on utilizing private physicians visits in a time series among the provinces. The findings showed that both direct OOP and the patients' geographical access to the specialists are still considered as determinant factors in utilizing health services. As such, it was understood that the effect of the elements varied depending on the existing facilities and circumstances of the provinces. Given the importance of each element in utilization rate by each province, the study could assist the SSO to create a situation in which the insured choose a combination of different providers

of health services (i.e. private, public and complimentary) dependent on their economic status and diseases. In addition, the insured enjoy the most suitable utilization from specialists services, along with the maximum utility.

As the final word, the study concluded that whilst the increased OOP in early years could change the patients' utilization pattern of visit services, given the inelasticity of health services, the patients might not stick to the imposed pattern permanently. In fact, the specialists in private sector seemed to be more visited by the insured, because of low indirect OOP for them in visiting this sector. In other words, the unit cost of visiting specialists in private sector found to be less than that in the apparently lower cost sectors (i.e. public and SSO-affiliated facilities). In addition, the study also showed that in utilizing medical services, the price was of a stronger and more direct effect as compared to the income factor.

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