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## FACTORS INFLUENCING HEALTH INSURANCE PREMIUMS IN THE KINGDOM OF SAUDI ARABIA

### Key Words

*Health Insurance, Saudi Arabia; Premium; Stepwise Regression; Socio-demographic variables; Health Indicators; Policy Coverage.*

### Abstract

*This study was conducted to determine the factors that influence the amount of private health insurance premiums in the Kingdom of Saudi Arabia. Data were collected from 493 randomly selected patients in several private hospitals in the Central Region. Results of the stepwise regression analysis show that health insurance premiums are significantly and positively affected by socio-demographic, health indicator and insurance policy coverage variables. These were: (1) age, (2) sex, (3) number of hospital admissions in the previous year, (4) number of physician visits in the previous month, (5) persons covered by health insurance, (6) choice of health care provider, (7) coverage for drug prescriptions, (8) coverage for major surgeries, (9) coverage for minor surgeries, and (10) coverage for eye diseases.*

### Introduction

It is a fact that modern technology has brought cures to certain diseases that only a couple of decades ago were incurable. However, it is also true that as modern technology prolongs the life of individuals, the same technology also alters the demographic composition of a society, such that life expectancy has increased resulting in a larger proportion of the elderly. Compared to the younger segment of the population, the elderly require more health care services. Thus, modern technology has caused a significant increase in the cost of health care

services. There is a widespread opinion that health care services have reached a stage where it is costing more to accomplish less, particularly in the case of hospital services, which account for the largest share of health spending (Battistella and Weil, 1989).

As health care costs are certain to continue escalating, governments that normally provide free health and medical care will have to deal with a greater financial burden. This gives rise to the need for exploring alternative sources of financing the health care sector. One such alternative is the utilization of health insurance, which can be considered as

a multifaceted product which protects against financial risk and also influences access to medical care (Thomas, 1994, 1995).

Insurance is generally a system of distributing risk in a way that the amount of risk is allowed for in premiums. Therefore, the main function of insurance is to spread the risk. In principle, this means that health insurance is supposed to spread the costs of sickness among the healthy and those who are not so healthy (White, 1991). However, health insurance has evolved over the years to have additional secondary functions, such as income redistribution from the well or the low-risk patient to the sick or high-risk patient; budgeting or paying in advance for medical care; and managing utilization and reducing inappropriate care through utilization review and other mechanisms (Siu, 1993).

Health insurance is intended to facilitate the financing of medical care. The justification for health insurance is the uneven and unpredictable incidence of illness, which leads to wide fluctuations in individual and family expenditures for medical care over time and to extreme differences among individuals and families at a given time (Siu, 1993). Therefore, health insurance has two aspects. First, it is a means for generating all or a portion of the financial resources to pay for health care. Second, it is an avenue for securing the provision of services.

In theory, consumers or their representatives purchase health insurance to protect their financial assets. Insurance transforms a small chance of potentially large illness-related health expenditures into a relatively smaller and known expenditures, which is usually a premium with allowances for expected copayments, if any. Briefly, econo-

mists argue that the average consumer benefits from purchasing insurance if the price of the policy does not greatly exceed the expected value of the policy's benefits (Siu, 1993).

The demand for health insurance is said to be influenced by such factors as how risk averse the individual is; the probability of the event's occurring; the magnitude of the loss; the price of insurance; and the income of the individual (Woolhandler and Himmelstein, 1988). However, insurance systems of health care have one fundamental problem, their overhead costs. Therefore, health insurance may also result in some inefficiencies in the provision of health services.

Health insurance has been widely used in western countries for a very long period of time. In the Kingdom of Saudi Arabia, the utilization of insurance as a source of financing the health sector is relatively new. The government's recent approval of the implementation of a national health insurance program highlights the importance of health insurance. This will make the population more financially responsible for their health care. Many citizens consider health care to be their birthright and the provision thereof, a responsibility of the government. Ideally, health insurance would result in greater access to, and more conscientious utilization of, health care services among individuals and, consequently, more cost-efficient operation of the health care industry.

Many earlier studies focused on factors that influence the purchase of health insurance. One specific example is that of Wilcox-Gök and Rubin (1994) which found that among elderly Medicare beneficiaries, health status and functional limitations were nega-

tively and significantly associated with having private health insurance. Among personal characteristics, education, sex and age were found to be systematically related to the presence of private health insurance. That is, those who were high school graduates were more likely to have private health insurance compared to those who did not finish high school. Women were more likely than men to have private health insurance and older people had lesser probability of being privately insured.

The above study also found that higher household income was positively and significantly associated with the probability of having private health insurance. Likewise, a study by Bloom (1988) found that adolescents belonging to poor families were least likely to be insured. These findings indicate that ability to pay is an important determinant of having private health insurance.

The implementation of any health insurance program is not a simple matter and many factors have to be taken into consideration. One such factor is the cost of the insurance or the premium that policyholders will have to pay. It is important to consider such factors in designing any health insurance program. Unfortunately, earlier studies hardly addressed the factors that influence the amount of health insurance premium. The closest that many previous studies have come to the issue of health insurance premium was to suggest that some socio-demographic factors and perceived health status influenced the willingness to pay a certain amount of health insurance premium (McCall *et al.*, 1991; Patrick *et al.*, 1992; Wilcox-Gök and Rubin, 1994; Kubrin, 1995). Markowitz and Colleagues (1991) also suggested that young persons

without dependents were less likely to purchase health insurance because they did not perceive a need for it.

So far, only three studies have cited factors that directly affect the amount of health insurance premiums. Chulis, *et al.* (1995) found that among Medicare beneficiaries with supplementary insurance policies, individually purchased health insurance plans had higher average premiums per person than employer-sponsored plans. Davis *et al.* (1995) found that 40% of those who have employer-provided insurance plans were required to make additional payments for visits to doctors that are outside of the plan. It was also found that 42% of low-income families and 46% of those in fair or poor health chose the least expensive health plan. Buchmueller (1995) indicated that those who preferred family coverage for a health insurance plan had to pay more compared to those who elected single-person coverage.

## Objectives of the Study

While earlier studies provided indicative characteristics as to who were willing to pay for private health insurance, these studies did not provide an idea as to the relationship between any of these characteristics and the amount of health insurance premiums. This study was conducted in view of the serious lack of empirical studies that directly focus on health insurance premiums. Specifically, this study aimed at determining the factors that directly influence the amount of private health insurance premiums and the relative impact of each variable on the premium. This provides baseline information to policy makers, especially when preparing the guidelines for the implementation of a national health

insurance program. To meet the objective of this study, a number of hypotheses were examined:

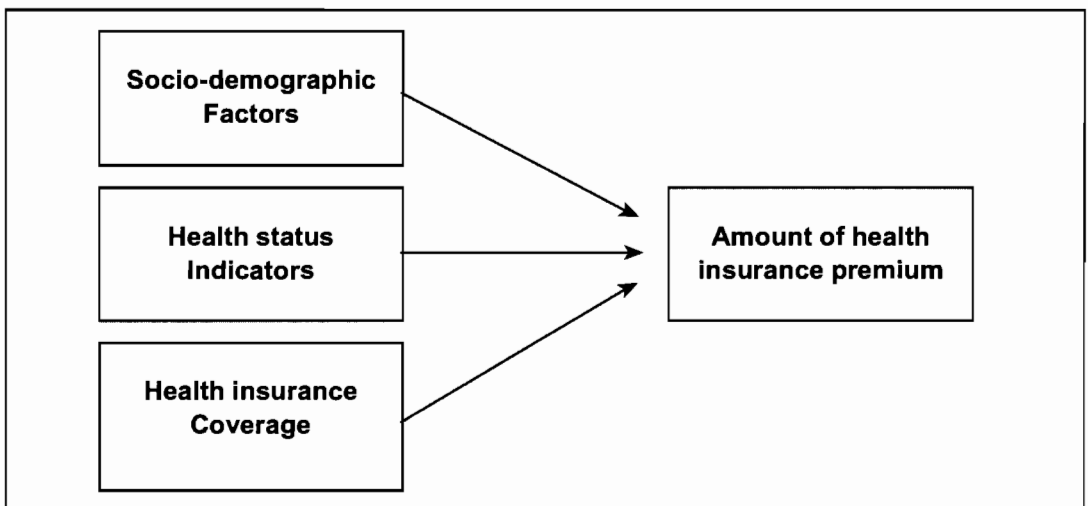
- (1) As stated earlier, several studies (McCall *et al*, 1991; Patrick *et al*, 1992; Wilcox-Gök and Rubin, 1994; Kubrin, 1995) suggested that socio-demographic variables had an effect on the willingness of individuals to pay a certain amount of health insurance premiums. Davis *et al* (1995) even found a direct relationship between family income and health insurance premiums. The current study examined the possible impact of several socio-demographic variables on the amount of health insurance premiums through hypothesis one ( $H_1$ ): socio-demographic variables had a statistically significant influence on the amount of private health insurance premiums in Saudi Arabia.
- (2) Earlier studies (Patrick *et al*, 1992; Wilcox-Gök and Rubin, 1994; Kubrin,

1995; Davis *et al*, 1995) suggested, either directly or indirectly, that health insurance premiums were affected by an individual's health status. Therefore, the second hypothesis ( $H_2$ ) examined by this study was whether health status indicators had a statistically significant influence on the amount of private health insurance premiums in Saudi Arabia.

- (3) The studies of Chulis *et al* (1995), Davis *et al* (1995) and Buchmueller (1995) found that certain aspects of health insurance plan coverage influenced the amount of premiums paid. Thus, this study examined a third hypothesis ( $H_3$ ) to determine if the coverage of a health insurance policy has a statistically significant influence on the amount of private health insurance premiums in Saudi Arabia.

On the basis of the above hypotheses, this study revolved around the conceptual model below:

**Figure 1**  
**Conceptual Model for the Study**



## Methodology

### Data Collection

Data were collected through a self-administered questionnaire from a random sample of 493 patients in several private hospitals in the Central Region. Data collection was conducted from August to December 1997. Only patients in private hospitals were included in the study because they were more likely to have health insurance, compared to the patients in government or public hospitals. A total of 650 questionnaires were distributed. Of these, 493 were completed and included for analysis. Thus, the response rate was 75.8%.

### Data Analysis Techniques

The data were then analyzed using descriptive statistics (frequency distribution and percentages) and multiple regression. Statistical significance of variables was measured at  $\alpha < 0.10$ . Tolerance, variance inflation factor and correlation of estimate tests were utilized to determine if there was multicollinearity among variables. Multiple regression analysis was utilized to determine the explanatory variables that have statistically significant influences on health insurance premiums. The original regression model used was of the form:

$$\text{HIPr} = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n$$

where: HIPr = dependent variables (health insurance premium)

$\beta_0$  = computed intercept

$X_1 \dots X_n$  = independent (explanatory) variables

$\beta_1 \dots \beta_n$  = computed coefficients of the independent variables

Socio-demographic characteristics, health status indicators and health insurance policy

characteristics and coverage were all included in the regression analysis as independent variables. The socio-demographic variables were: 1- age (Age); 2- sex (Sex); 3- number of dependents (Dep); 4- number of family members who work (Fwork); and 5- monthly family income (Inc). The health status indicators were: 1- presence of chronic disease (DsChr); 2- number of physician visits in the previous month (MDVis); and 3- number of hospital admissions in the previous year (Adm). The health insurance variables were: 1- means of insurance purchase (Means); 2- choice of health care provider (ChPr); 3- persons covered by health insurance (Pers); 4- coverage for drug prescriptions (HiDr); 5- coverage for major surgeries (HiMjS); 6- coverage for minor surgeries (HiMnS); 7- coverage for psychiatric services (HiPsy); 8- coverage for dental services (HiDent); 9- coverage for eye diseases (HiEye); and 10- coverage for outpatient visits (HiOP).

After computing the Pearson correlation coefficients, it was found that the number of family members who work and health insurance coverage for dental services were highly correlated with other independent variables. Therefore, these two variables were dropped out of the general stepwise regression model.

A multiplicative model was utilized in order to estimate the elasticity of health insurance premium, relative to the independent variables. Logarithmic transformation was then employed on continuous variables only. These variables were: 1- age; 2- number of dependents; 3- monthly family income; 4- number of physician visits in the previous month; and 5- number of hospital admissions in the previous year. The general stepwise regression model then assumed the following form:

$$\text{Log}(\text{HIPr}) = \beta_0 + \beta_1 \log(\text{Age}) + \beta_2 \text{Sex} + \beta_3 \log(\text{Dep}) + \beta_4 \log(\text{Inc}) + \beta_5 \text{DsChr} + \beta_6 \log(\text{MDVis}) + \beta_7 \log(\text{Adm}) + \beta_8 \text{Means} +$$

$$\beta_9\text{ChPr} + \beta_{10}\text{Pers} + \beta_{11}\text{HiDr} + \beta_{12}\text{HiMjS} + \beta_{13}\text{HiMnS} + \beta_{14}\text{HiPsy} + \beta_{15}\text{HiEye} + \beta_{16}\text{HiOP}$$

## Analysis and Results

Table 1 shows the socio-demographic profile of this study's respondents and their health status indicators. It can be seen from this table that respondents were generally young, with a mean age of 34.8 years. More than one-third (34.9%) of the respondents was less than 30

years old and half of all respondents were aged 30-45 years old. The vast majority (90.1%) of respondents were male and more than two-fifths (43.2%) had more than one dependent. On average, there were three dependents for every two respondents. On the other hand, there was an average of only one working family member for every two respondents. The greatest proportion (44.2%) of respondents belonged to a family with a monthly income of SR2500 to SR5000.

**Table 1**  
**Socio-Demographic Variables and Health Status Indicators, Health Insurance Premium Study, Saudi Arabia, 1998 (n = 493)**

| VARIABLE                                           | DISTRIBUTION |      | MEAN  | STD. DEV. |
|----------------------------------------------------|--------------|------|-------|-----------|
|                                                    | Frequency    | %    |       |           |
| Socio-demographic variables                        |              |      |       |           |
| Age                                                |              |      | 34.77 | 9.71      |
| Less than 30 years old                             | 172          | 34.9 |       |           |
| 30 - 45 years old                                  | 247          | 50.0 |       |           |
| 46 - 60 years old                                  | 66           | 13.4 |       |           |
| More than 60 years old                             | 8            | 1.6  |       |           |
| Sex                                                |              |      | 0.10  | 0.60      |
| Male                                               | 444          | 90.1 |       |           |
| Female                                             | 49           | 9.9  |       |           |
| Number of dependents                               |              |      | 1.52  | 1.33      |
| None                                               | 117          | 23.7 |       |           |
| One                                                | 163          | 33.1 |       |           |
| More than one                                      | 213          | 43.2 |       |           |
| Number of family members who work                  |              |      | 0.49  | 0.50      |
| None                                               | 250          | 50.7 |       |           |
| One or more                                        | 243          | 49.3 |       |           |
| Monthly family income                              |              |      | 6,894 | 5,869     |
| Less than SR2,500                                  | 47           | 9.5  |       |           |
| SR2,500 - SR5,000                                  | 218          | 44.2 |       |           |
| SR5,001 - SR10,000                                 | 145          | 29.4 |       |           |
| SR10,001 - SR20,000                                | 70           | 14.2 |       |           |
| More than SR20,000                                 | 13           | 2.6  |       |           |
| Health status indicators                           |              |      |       |           |
| Presence of chronic disease                        |              |      | 0.03  | 0.18      |
| No chronic disease                                 | 476          | 96.6 |       |           |
| Has chronic disease                                | 17           | 3.4  |       |           |
| Number of physician visits in the previous month   |              |      | 1.33  | 1.69      |
| One                                                | 472          | 95.7 |       |           |
| More than one                                      | 21           | 4.3  |       |           |
| Number of hospital admissions in the previous year |              |      | 4.84  | 3.97      |
| One                                                | 164          | 33.3 |       |           |
| 2 -5                                               | 165          | 33.4 |       |           |
| More than five                                     | 164          | 33.3 |       |           |

Generally, the respondents were in relatively fair health, with only a small proportion having chronic disease (3.4%). The vast majority (95.7%) had visited a physician only once in the previous month, with a mean of 1.3 physician visits in the same period. The rate of hospital admission was quite high as

shown by the average hospital admissions of 4.8 in the previous year. One-third of the respondents were admitted to a hospital only once, another third had 2-5 admissions and the remaining third were admitted in the hospital more than five times in the previous year.

**Table 2**  
**Distribution of Health Insurance-Related Variables, Saudi Arabia, 1998 (n = 493).**

| VARIABLE                                                    | DISTRIBUTION |      | MEAN  | STD.<br>DEV. |
|-------------------------------------------------------------|--------------|------|-------|--------------|
|                                                             | Frequency    | %    |       |              |
| <i>Annual health insurance premium</i>                      |              |      | 2,391 | 1,403        |
| Less than SR1,000                                           | 116          | 23.5 |       |              |
| SR1,000 - SR2,500                                           | 169          | 34.3 |       |              |
| SR2,501 - SR5,000                                           | 199          | 40.4 |       |              |
| More than SR5,000                                           | 9            | 1.8  |       |              |
| <i>Means of health insurance purchase</i>                   |              |      | 0.46  | 0.50         |
| Individually purchased                                      | 227          | 46.0 |       |              |
| Employer-provided                                           | 266          | 54.0 |       |              |
| <i>Choice of health care provider</i>                       |              |      | 0.48  | 0.50         |
| Patient has no choice                                       | 259          | 52.5 |       |              |
| Patient has choice                                          | 234          | 47.5 |       |              |
| <i>Persons covered by health insurance</i>                  |              |      | 0.43  | 0.50         |
| Self only                                                   | 282          | 57.2 |       |              |
| Self and family                                             | 211          | 42.8 |       |              |
| <i>Health insurance covers cost of drug prescriptions</i>   |              |      | 0.69  | 0.46         |
| Yes                                                         | 342          | 69.4 |       |              |
| No                                                          | 151          | 30.6 |       |              |
| <i>Health insurance covers cost of major surgeries</i>      |              |      | 0.36  | 0.48         |
| Yes                                                         | 175          | 35.5 |       |              |
| No                                                          | 318          | 64.5 |       |              |
| <i>Health insurance covers cost of minor surgeries</i>      |              |      | 0.77  | 0.42         |
| Yes                                                         | 382          | 77.5 |       |              |
| No                                                          | 111          | 22.5 |       |              |
| <i>Health insurance covers cost of psychiatric services</i> |              |      | 0.64  | 0.48         |
| Yes                                                         | 317          | 64.3 |       |              |
| No                                                          | 176          | 35.7 |       |              |
| <i>Health insurance covers cost of dental services</i>      |              |      | 0.72  | 0.45         |
| Yes                                                         | 354          | 71.8 |       |              |
| No                                                          | 139          | 28.2 |       |              |
| <i>Health insurance covers cost of eye diseases</i>         |              |      | 0.61  | 0.49         |
| Yes                                                         | 301          | 61.1 |       |              |
| No                                                          | 192          | 38.9 |       |              |
| <i>Health insurance covers cost of outpatient visits</i>    |              |      | 0.83  | 0.38         |
| Yes                                                         | 408          | 82.8 |       |              |
| No                                                          | 85           | 17.2 |       |              |

The health insurance-related variables are presented in Table 2. This table shows that the mean annual health insurance premium was SR2391. Almost a quarter of the respondents paid less SR1000; more than one-third paid from SR1000 to SR2500; and a small proportion paid more than SR5000. The highest proportion paid from SR2501 to SR5000. More than half of the respondents had their health insurance through their employers (54%), having no choice of health provider

(52.5%), and those having an insurance policy that covered only themselves (57.2%).

In terms of coverage, the majority of respondents indicated that their health insurance policies covered the costs of drug prescriptions (69.4%), minor surgeries (77.5%), psychiatric services (64.3%), dental services (71.8%), eye diseases (61.1%) and outpatient visits (82.8%). On the other hand, just over a third (35.5%) of the respondents indicated that their insurance policies covered the costs of major surgeries.

**Table 3**  
**Results of the Initial Step of the Stepwise Regression Analysis (Backward Elimination Process) of Factors that May Influence the Amount of Annual Health Insurance Premiums, Saudi Arabia, 1998 (n = 493)**

| Independent variables                                | Measurement code           | Beta     |         |                     |
|------------------------------------------------------|----------------------------|----------|---------|---------------------|
|                                                      |                            | Estimate | F-value | Prob.               |
| Number of hospital admissions in the previous year   | Continuous (logged)        | 0.59     | 218.05  | 0.0001 <sup>a</sup> |
| Age                                                  | Continuous (logged)        | 0.74     | 26.03   | 0.0001 <sup>a</sup> |
| Health insurance covers cost of major surgeries      | Yes = 1                    | 0.30     | 15.88   | 0.0001 <sup>a</sup> |
| Persons covered by health insurance                  | Self and family = 1        | 0.29     | 17.52   | 0.0001 <sup>a</sup> |
| Number of physician visits in the previous month     | Continuous (logged)        | 0.24     | 11.25   | 0.0009 <sup>a</sup> |
| Sex                                                  | Female = 1                 | 0.13     | 7.63    | 0.006 <sup>a</sup>  |
| Health insurance covers cost of drug prescriptions   | Yes = 1                    | 0.34     | 6.17    | 0.013 <sup>a</sup>  |
| Health insurance covers cost of eye diseases         | Yes = 1                    | 0.28     | 6.12    | 0.014 <sup>a</sup>  |
| Choice of health care provider                       | Patient has choice = 1     | 0.15     | 5.66    | 0.018 <sup>a</sup>  |
| Health insurance covers cost of outpatient visits    | Yes = 1                    | 0.16     | 3.06    | 0.081 <sup>a</sup>  |
| Health insurance covers cost of minor surgeries      | Yes = 1                    | 0.20     | 2.84    | 0.093 <sup>a</sup>  |
| Means of health insurance purchase                   | Individually purchased = 1 | 0.11     | 2.62    | 0.11 <sup>ns</sup>  |
| Presence of chronic disease                          | Has chronic disease = 1    | 0.23     | 1.19    | 0.28 <sup>ns</sup>  |
| Number of dependents                                 | Continuous (logged)        | 0.06     | 1.20    | 0.28 <sup>ns</sup>  |
| Health insurance covers cost of psychiatric services | Yes = 1                    | 0.04     | 0.16    | 0.69 <sup>ns</sup>  |
| Monthly family income                                | Continuous (logged)        | 0.01     | 0.05    | 0.83 <sup>ns</sup>  |
| Intercept = 9.67                                     |                            |          |         |                     |
| Adjusted R-square = 0.4714                           |                            |          |         |                     |
| Overall F-value = 20.01 (p = 0.0001)                 |                            |          |         |                     |

*a* = statistically significant

*ns* = not statistically significant

**Table 4**  
**Results of the Stepwise Regression Analysis (Backward Elimination Process) of Significant Factors that Influence the Amount of Annual Health Insurance Premiums, Saudi Arabia, 1998 (n = 493)**

| Independent variables                              | Measurement code       | Beta     |         |        |
|----------------------------------------------------|------------------------|----------|---------|--------|
|                                                    |                        | Estimate | F-value | Prob.  |
| Number of hospital admissions in the previous year | Continuous (logged)    | 0.59     | 226.68  | 0.0001 |
| Age                                                | Continuous (logged)    | 0.81     | 33.59   | 0.0001 |
| Health insurance covers cost of major surgeries    | Yes = 1                | 0.31     | 16.82   | 0.0001 |
| Persons covered by health insurance                | Self and family = 1    | 0.32     | 25.01   | 0.0001 |
| Sex                                                | Female = 1             | 0.16     | 10.64   | 0.0012 |
| Number of physician visits in the previous month   | Continuous (logged)    | 0.20     | 8.92    | 0.0030 |
| Health insurance covers cost of drug prescriptions | Yes = 1                | 0.35     | 7.19    | 0.0077 |
| Health insurance covers cost of minor surgeries    | Yes = 1                | 0.29     | 6.47    | 0.0114 |
| Choice of health care provider                     | Patient has choice = 1 | 0.14     | 5.39    | 0.0208 |
| Health insurance covers cost of eye diseases       | Yes = 1                | 0.25     | 5.29    | 0.0220 |
| Intercept = 9.56                                   |                        |          |         |        |
| Adjusted R-square = 0.4572                         |                        |          |         |        |
| Overall F-value = 30.74 (p = 0.0001)               |                        |          |         |        |

The results of the final step of the stepwise regression (Table 4) indicate that 10 of the 16 independent variables included in the analysis had a statistically significant and positive impact on the amount of annual health insurance premiums. The six variables that were not found to have a statistically significant influence on health insurance premiums were: 1- number of dependents; 2- monthly family income; 3- presence of chronic diseases; 4- means of health insurance policy purchase; 5- health insurance coverage for psychiatric services; and 6- health insurance coverage for outpatient visits. Considering the statistically significant variables, the results of the stepwise regression analysis yield the following model for health insurance premiums:

$$\log(\text{HIPr}) = 9.56 + 0.59\log(\text{Adm}) + 0.81\log(\text{Age}) + 0.31(\text{HiMjS}) + 0.32(\text{Pers}) + 0.16(\text{Sex}) + 0.20\log(\text{MDVis}) + 0.35(\text{HiDr}) + 0.29(\text{HiMnS}) + 0.14(\text{ChPr}) + 0.25(\text{HiEye})$$

where:

$\log(\text{HIPr})$  = logarithmic value of annual health insurance premiums

$\log(\text{Adm})$  = logarithmic number of hospital admissions in the

previous year ( $\beta$ -estimate = 0.59;  $p = 0.0001$ )

$\log(\text{Age})$  = logarithmic age of the insured person

( $\beta$ -estimate = 0.81;  $p = 0.0001$ )

$\text{HiMjS}$  = health insurance coverage for major surgeries

( $\beta$ -estimate = 0.31;  $p = 0.0001$ )

|            |   |                                                                                               |
|------------|---|-----------------------------------------------------------------------------------------------|
| Pers       | = | persons covered by health insurance<br>( $\beta$ -estimate = 0.32; $p$ = 0.0001)              |
| Sex        | = | sex of the insured person<br>( $\beta$ -estimate = 0.16; $p$ = 0.0012)                        |
| Log(MDVis) | = | number of physician visits in the previous month<br>( $\beta$ -estimate = 0.20; $p$ = 0.0030) |
| HiDr       | = | health insurance coverage for drug prescriptions<br>( $\beta$ -estimate = 0.35; $p$ = 0.0077) |
| HiMnS      | = | health insurance coverage for minor surgeries<br>( $\beta$ -estimate = 0.29; $p$ = 0.0114)    |
| ChPr       | = | choice of health care provider<br>( $\beta$ -estimate = 0.14; $p$ = 0.0208)                   |
| HiEye      | = | health insurance coverage for eye diseases<br>( $\beta$ -estimate = 0.25; $p$ = 0.0220).      |

The regression model suggests that annual health insurance premiums would increase by an average of 8% for every 10% average increase in the age of the insured person, assuming all other things are the same. This indicates that annual health insurance premiums are inelastic with regard to age. In terms of sex, the regression model indicates that insured female persons would pay a higher insurance premiums than would be paid by insured male persons. These results lead to the acceptance of hypothesis one (H1) with regard to age and sex.

However, above hypothesis (H1) cannot be accepted in terms of monthly family income and number of dependents. Contrary to expectation, income did not have a statistically significant influence on the amount of annual health insurance premiums. This also contradicts the earlier findings of Davis *et al*

(1995). One possible explanation is that more than half of the respondents obtained their health insurance through their employers. This indicates that regardless of the family income, the amount of annual health insurance premiums would remain the same, assuming all other things remained constant.

Contradictory results were obtained regarding the persons covered by health insurance in a sense that while an insurance policy that covered the entire family had a statistically significant effect on the annual health insurance premiums, the number of dependents was not found to be a statistically significant predictor of health insurance premiums. These results suggest that for someone with a large family or having many dependents, it would be more cost-effective to purchase an insurance policy that covers the entire family, rather than a policy that covers only one person.

Among the three health status indicators, only two were found to have statistically significant influences on the amount of health insurance premiums: number of hospital admissions in the previous year and number of physician visits in the previous month. Therefore, we accept hypothesis two (H2) with regards to these two variables. We reject the same hypotheses with regards to the presence of chronic disease. This variable was not found to have a statistically significant influences on the amount of annual health insurance premiums. However, the number of hospital admissions or physician visits could also be indicators of the presence or absence of chronic diseases.

The regression model indicates that, assuming all other things remain the same, an average of 10% increase in hospital admis-

sions in the previous year would result to an average of 6% increase in annual health insurance premiums. On the other hand, an average of 10% increase in the number of physician visits in the previous month would only result to an average increase of 2% in annual health insurance premiums. The above results mean that, as with age, annual health insurance premiums are inelastic with regard to the number of hospital admissions in the previous year and the number of physician visits in the previous month.

The majority of the variables directly related to the health insurance policy each had a statistically significant impact on the amount of annual health insurance premium, assuming all other things remained the same. Therefore, we accept hypothesis three (H3) in terms of persons covered by health insurance, choice of health care provider, coverage for major surgeries, coverage for minor surgeries, coverage for drug prescriptions, and coverage for eye diseases. However, we cannot accept the same hypothesis with regard to means of health insurance purchases, coverage for psychiatric services and coverage for outpatient visits. That is because, these variables were not found to have a statistically significant influence on the amount of annual health insurance premium.

The regression model suggests that, compared to an insurance policy that would cover only one person, an insurance policy that would have coverage for the entire family would be more expensive. This result confirms the findings of an earlier study which found that an insurance policy with family coverage would cost more than one with single-person coverage (Buchmueller, 1995). Furthermore, an insurance policy that provided the policy-

holder with a choice of health care provider would also be more expensive than a policy which would not provide the insured with such choice. This supports the findings of Davis *et al* (1995).

From the results of the stepwise regression analysis, it can also be inferred that an individually purchased health insurance policy would not be significantly more expensive than a health insurance policy that would be purchased through the employer. This finding is rather unexpected since employers normally pay a certain percentage of the premium. Furthermore, these results contradict that of an earlier study which found that health insurance plans purchased through the employer had a lower average premium than insurance plans which were individually purchased (Chulis *et al*, 1995).

Among the medical costs, the regression model indicates that coverage for drug prescriptions would have the greatest independent impact on annual health insurance premiums, assuming all other things remained the same. In decreasing influence on health insurance premiums, coverage for drug prescriptions is followed by coverage for major surgeries, coverage for minor surgeries and then coverage for eye diseases.

## Conclusion and Implications

The results of this study show that health insurance premiums are directly affected by some demographic factors, health status indicators and the health insurance policy coverage. Specifically, older persons and women were found to pay higher premiums than younger persons or male. Those who had either visited a physician in the previous month or were hospitalized in the previous year could also be expected to pay a higher

health insurance premiums than those who neither had visited a physician in the previous month nor was admitted to a hospital in the previous year.

Health insurance premiums were found to be inelastic with regard to age, number of hospitalizations in the previous year and number of physician visits in the previous month. This means that these variables have a weak influence on the amount of health insurance premiums. Nonetheless, the premium could be expected to increase as the insured person gets older or as the number of hospitalizations or physician visits increase.

With regard to cost coverage, a health insurance policy that covers either the cost of drug prescriptions, major surgeries, minor surgeries or eye diseases would tend to be more expensive than a policy that does not have coverage for any of these services. Coverage for psychiatric services and for outpatient visits were not found to have statistically significant influence on the amount of health insurance premiums. This indicates that annual health insurance premiums will be basically the same regardless of whether the insurance policy covers the costs of the above medical services. Therefore, it would be more cost-effective to purchase a health insurance policy that provides coverage for these services than to purchase a policy that does not offer such coverage. Finally, an insurance policy that allows the insured a free choice of health care providers would require a higher premium than when purchasing an insurance policy that does not provide the insured with such free choice or which only provides a very limited choice of health care providers.

As the government adopts a national health insurance program, health insurance can be expected to have an important influence on obtaining quality health care services. Therefore, employers can use the provision of

health insurance benefits as one incentive for retaining highly skilled personnel and minimizing employee turnover.

The limitation of this study was that data were collected from respondents only in one geographic region (Central Region). Thus, caution should be taken in generalizing these findings. It should be noted that the stepwise regression model had an adjusted  $R^2$  of only 0.4572. This means that, assuming all other things remained constant, all the statistically significant variables combined accounted for only 45.72% of the variation in the amount of annual health insurance premiums. This means that there are other variables that significantly influence the amount of annual health insurance premiums but were not covered by this study. These may include other factors, such as policies of the government towards the provision of health services, availability of free health services or other alternatives, inappropriate utilization of health services, copayments and deductibles.

Regardless of the above limitations, this study was able to clearly indicate not only the factors that have a direct and significant impact on health insurance premiums, but also the relative influence of each variable. As such, the findings presented here provide both an important starting point for other studies on health insurance and also some empirical bases for future computations of health insurance premiums.

In view of this study's limitations and the growing importance of insurance as a means of financing the health sector, it is highly recommended that future studies be conducted to determine the other factors that may significantly influence health insurance premiums. It will also be beneficial to cover a larger geographical area and to include a greater number of respondents.

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## المخلص

### العوامل المؤثرة على قسط التأمين الصحي في المملكة العربية السعودية

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أجريت هذه الدراسة لتحديد العوامل التي تؤثر على قيمة قسط التأمين الصحي الخاص في المملكة العربية السعودية . وقد تم تجميع البيانات من عينة من المرضى عددهم ٤٩٣ مريض ، تم اختيارهم عشوائياً من عدة مستشفيات خاصة بالمنطقة الوسطى . وقد أوضحت نتائج تحليل الانحدار التدريجي ، أن قسط التأمين الصحي يتأثر فعلياً وبشكل هام بالعوامل الديموغرافية والمؤشر الصحي والمتغيرات ذات العلاقة بتغطية بوليصة التأمين ، وهذه المتغيرات : العمر ، الجنس ، عدد مرات دخول المستشفى خلال السنة السابقة ، عدد الزيارات للأطباء خلال الشهر السابق ، الأشخاص المغطون بالتأمين الصحي ، اختيار مقدم الرعاية الصحية ، تغطية وصفات الأدوية ، تغطية العمليات الجراحية الكبرى ، تغطية العمليات الجراحية الصغرى ، وتغطية أمراض العيون .

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