Determinants of out of pocket healthcare expenditures: The case of Mugla province in Turkey

Bilge Senturk*, Faculty of Economics and Administrative Science, Mugla Sitki Kocman University, 48000 Mugla, Turkey

Aysun Danisman Isik, Faculty of Economics and Administrative Science, Mugla Sitki Kocman University, 48000 Mugla, Turkey

Cisel Ekiz Gokmen, Faculty of Economics and Administrative Science, Mugla Sitki Kocman University, 48000 Mugla, Turkey

Abstract

As the share of health care financing from public funds was increasing in Turkey, the utilization of the health care services has also increased, dramatically. Despite of universal health coverage, the result of this trend causes to increase the incidence of making out of pocket expenditures. The aim of this study is to evaluate the determinants of households' health expenditures in Mugla province of Turkey. A total of 204 households living in the central district of Mugla were surveyed and questioned both for their total consumption and health expenditures, as well as their health status, demographic and socio-economic characteristics. Ordinary least square method was used for the multiple regression analysis to identify the factors that affect the out of pocket health care expenditures. In addition to other empirical studies in Turkey, the effects of relative poverty and types of income and occupation on oop expenditures were estimated. Results identify that consumption expenditure of the household, poverty, wage/income status, education, household size, having chronic disease and having elderly in the households have significant effects on the amount of out of pocket (oop) health expenditure of the households.

Keywords: Health care financing; Out of pocket payments; Ordinary least square method; Turkey

* ADDRESS FOR CORRESPONDENCE: **Bilge Senturk,** Faculty of Economics and Administrative Science, Mugla Sitki Kocman University, 48000 Mugla, Turkey. *E-mail address*: bilge.senturk@mu.edu.tr

1. Introduction

In Turkey, while most of the population is covered by the general health insurance system, out-of-pocket expenditures are still quite noteworthy. Within the context of Health Care Transformation Program, general health insurance system was established in 2006, increasing the ratio of the population covered by health insurance. One of the expected consequences of increased coverage is a decline in the oop health care expenditures; however, a significant increase was observed instead during the period in question. The ratio of population covered by the public insurance system was reported to be 70% in 2002 (Turkstat, 2002), the same ratio has reached to 87% by 2017 (SGK, 2019). At the same time, oop health expenditure per capita increased from 95 USD to 185 USD between 2002 and 2016 (the figures were calculated using purchasing power parity exchange rate; MoH, 2017). The rapidly increase in health care utilization following the implementation of Health Care Transformation Program along with the cost-sharing practices can explain this seemingly paradoxical increase in out-of-pocket expenses: Total number of physician visits was reported to have increased by 3.4 times between 2002 and 2017 (MoH, 2018).

The aim of this study is to evaluate the determinants of households' health expenditures and the findings come from the data collected in Mugla Province County. For this purpose the demographic, socio-economic and health care need characteristics of the households are estimated. In addition to other related empirical studies, we estimate the effects of relative poverty and other socio-economic characteristics of the households on oop expenditures such as types of income and occupation. After a brief literature review on health expenditures, the model and data used in the analysis are introduced and the findings from the field research are presented, respectively. In the last section, the econometric regression results and related policy recommendations are going to be provided.

2. Literature review

The studies on the determinants of oop health care expenditures mostly focus on the characteristics of the individual patients and the household they belong to. This approach is somehow in accordance with the health economics theory analyzing health care expenditures through three main factors: the price of the service, household income and household characteristics that influence preferences (such as age, gender, education etc.) (Feldstein, 1993). According to this theory, price of the service is simply defined as the cost of the service to the household. However, factors which determine the price depend on the health care system in place. For example, factors such as the coverage of public health insurance system, the exempted status of particular demographic groups, the prevalence of private health care and insurance services, and the prevalence of informal payment practices (through gifts etc.) might determine the amount of oop health expenditures. In other words, oop payments are controlled by the institutional structure or by the health care providers. Naturally, the health expenditures are expected to increase as the household income rises; since the households would use health care services more frequently and/or would prefer more expensive treatments with a higher disposable income. The characteristics which affect the preferences are basically the factors that determine the health care utilization, influenced not only by characteristics of the household (related to demographic, socio-economic and health status of the individuals), but also by the characteristics of health care institutions (service quality, distance etc.) (Mills & Gilson, 1988; Akin et al., 1995; Lahiri & Xing, 2001).

Accordingly, the most prominent variables that are expected to affect oop expenditures are gender, marital status, health problems (chronic/acute), perceived health status (good/bad), size of the household, age, having a member aged 5 and younger (pre-school child) or aged 65 and older (elderly), educational level, occupation, household income, insurance status, location of residence. Several international studies reveal that "age of the individual in question" (Todd, 2001; Hotchkiss et al., 2005; You & Kobayashi, 2011; Wang et al., 2016; Mahumud et al., 2017; Narang & Nicholas, 2017), "persistent health problems" (Ruger & Kim, 2007; Correa-Burrows, 2012; Narang & Nicholas, 2017),

"size of the household" (Todd, 2001; Ahmed, 2006), "household income" (Todd, 2001; Ahmed, 2006; Mwandira, 2011; You & Kobayashi, 2011; Correa-Burrows, 2012; Wang et al., 2016; Mahumud et al., 2017; Narang & Nicholas, 2017), and "educational level" (You & Kobayashi, 2011; Correa-Burrows, 2012; Wang et al., 2016; Mahumud et al., 2017; Narang & Nicholas, 2017) all increase amount of oop health expenditures. Existence of household members aged 5 and younger and/or aged 65 and older is another factor that increases oop spending on health care (Hotchkiss et al., 2005; You & Kobayashi, 2011). The impact of health insurance status is likely to depend on the insurance coverage in the health care system. However, lack of any insurance is a significant factor that increases oop expenditure (Wang et al., 2016; Mahumud et al., 2017; Narang & Nicholas, 2017). The findings regarding the impact of insurance status and gender vary from country to country. However, most studies reveal that women on average tend to pay more for the health care compared to men (Wang et al., 2016; Mahumud et al., 2017; Narang & Nicholas, 2017). Yet, some studies also show higher oop spending among men (Mwandira, 2011; Basumataru & Srivastav, 2017).

There are only a handful of studies that econometrically analyzes determinants of the amount of oop health care expenditures in Turkey (Liu et al., 2005; Oz, 2008; Sozmen & Unal, 2013; Yardim et al., 2014; Giovanis & Ozdamar 2017; Islek et al., 2018). Most of the studies utilize a multilinear regression model with "oop expenditure" as the dependent variable. One of the earliest examples of such studies, Liu et al. (2005) reports only two statistically significant independent variables that impact oop health care expenditures: being insured increases the expenditure while living in the Western part of Turkey decreases it. No statistically significant relationship was found for gender, marital status, age, educational status, income quintile, health status and location of residence (urban/rural) variables.

Sozmen & Unal (2013), using the data from 2008 TurkStat Household Budget Survey, report that having more than 5 members in the household; the head of the household being older than 55 and married, and having issued a "Green Card"; existence of sick/disabled/elderly members or pre-school children in the household; and belonging to high income level group all increases oop health care expenditures significantly. Oz (2008), applies a similar model using the data from TurkStat Household Budget Surveys from 2003, 2004 and 2005 and finds statistically significant positive relationship between oop payments and the ratio of household members with insurance coverage, household members that state disability/illness as a reason for not seeking employment, ratio of members with post-graduate degrees, and ratio of currently married members. Yardim et al., (2014) utilizes the data from 2003, 2006 and 2009 Household Budget Surveys in a linear regression model. They report an increase in out-of-pocket health expenditures as the income quintile rises, regardless of the type of the insurance system. Existence of children between the ages 0 and 5 is another contributing factor under every insurance system. Also, household size, living in a rural area or having tertiary degrees significantly increase the out-of-pocket expenditures of households covered by the public insurance system. Existence of elderly household members over 64 increases out-of-pocket expenditure for households covered by private insurance or households without any coverage; the relationship was not significant for households under public system coverage. For households without any insurance coverage; household size, elderly members and living in a rural area were shown to increase out-of-pocket payments significantly.

Giovanis & Ozdamar (2017) analyze the data from TurkStat Household Budget Surveys between 2002 and 2012. Their model shows a statistically significant increase in out-of-pocket expenses as the average age of the household, household size and household income rise. Married people spent more out-of-pocket compared to divorcees or widowers, unemployed individuals have higher out-of-pocket expenditures compared to the employed. Islek et al. (2018) investigates oop expenditures by in-patients under treatment for psychotic disorders via a logistic regression model. According to their findings the type of disorder, insurance coverage, income and occupational status all have statistically significant impact on out-of-pocket expenditure. Patients without any health insurance pay more out-of-pocket compared to those who are insured, unemployed patients spend more than employed patients. Patients in the highest income quintile spend more out-of-pocket compared to patients in

the lowest income quintile. Out-of-pocket expenditure was shown to vary significantly according to the type of the disorder the patients have.

3. Method

Data for the present study was collected by a household survey carried out between April and June in 2011. A total of 204 households living in the central district of Mugla were surveyed and questioned both for their total consumption and health expenditures during the last month, as well as their health status and demographic characteristics. The multiple regression model is:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + u$$

where Yi is dependent variable (the natural logarithm of the monthly amount of oop health expenditures paid by the households' own financial resources). X1..k were the explanatory variables and β was the coefficient of them; also α shows the unknown intercept term and "u" represents the random error term. Independent variables are age, education, income status (regular or non-regular) and occupation (professional/semi-professional or nonprofessional) status of the household head, having a health insurance by the household head, household size, total monthly expenditure of the household, having chronic disease, pre-schooled (0-5 age) child and elderly (over 64 age) in the households and being relatively poor (households having less than half of the average income of the sample). As well as the dependent variable, some independent variables were also analyzed by logarithmic forms: these are age, education (years of schooling), household size and total expenditure. Also the variable of education is analyzed by taking the square of the schooling years due to the expectation of having a nonlinear relationship between education and oop expenditures. To control whether the model has any heteroscedasticity and modeling problem, we applied Breusch-Pagan / Cook-Weisberg test and Ramsey RESET test with the statistical program of STATA 14.0. The Breusch-Pagan / Cook-Weisberg test results show that there is heteroscedasticity in the model and this problem has been corrected (Ho: model has no omitted variables; Prob > chi2 = 0.0008). According to Ramsey RESET test (Ho: no omitted variables; Prob > F= 0.3215), there is any modeling error in the analysis.

4. Results

For the regression analysis, 200 household's data which spend on health care was considered. Only two households were excluded for the regression analysis due to not paying any amount of health care expenditure within the survey year since they are supposed to not use any health care services. Table 1 shows the descriptive statistics of the data. The mean age of the household head is 45.5 and all of them are married. According to descriptive statistical results, the mean total oop expenditures (monthly) are 26.12 USD. The differences between household characteristics show that households with chronic disease pay 57% more than the other households. Also, the households having 0-5 year old children or elderly pay almost 26% than the others. When we look at the difference between relatively poor households, they also pay 25% more than non-poor households. The study sample contains only two households without any health insurance and they pay little less amount of oop according to the insured households.

Table 1. Descriptive Statistics

Variables	Number of observations	%	Total health expenditure (average $)
Household health expenditure(monthly)	202	-	26.12 (3.3–326.2)*
Household total consumption expenditure	(average: 1,049.36$) (313$–3,288$)*	-	
Age of household head (average)	45.49	-	-
Years of schooling:			
1	1	0.50	6.7
5	41	20.30	25.9 (3.3–166.4)
8	24	11.88	27.1 (6.7–73.2)
11	61	30.20	30.0 (3.3–326.2)
13	13	6.44	21.9 (10–66.6)
15	54	26.73	23.0 (6.7–99.9)
18	6	2.97	25.0 (6.7–43.3)
24	2	0.99	26.6 (20–33.3)
Having regular income	79	39.11	24.2 (6.7– 99.9)
Having non- regular income	123	60.89	27.4 (3.3– 326.2)
Having professional or semi-professional occupation	109	53.96	26.2 (3.3–326.2)
Having unqualified occupation	93	46.04	26.0 (3.3–173.1)
Household head with health insurance	200	99.01	26.2 (3.3–326.2)
Household head without health insurance	2	0.99	20 (20–20)
Households with chronic diseases	81	40.10	33.4 (3.3–326.2)
Households without chronic disease	121	59.90	21.3 (3.3–99.9)
Households with children between 0–5 years old	48	23.76	21.7 (6.7–99.9)
Households without children between 0–5 years old	154	76.24	27.5 (3.3–326.2)
Households with member over 64 years old	16	7.92	32.5 (6.7–73.2)
Households without member over 64 years old	186	92.08	25.6 (3.3–326.2)
Household Size:			
2	52	25.74	24.7 (3.3–166.4)
3	70	34.65	28.4 (3.3–326.2)
4	70	34.65	24.1 (3.3–99.9)
5	10	4.95	31.3 (10– 66.6)
Relatively poor households	29	14.36	31.4 (3.3–166.4)
Relatively non-poor households	173	85.64	25.2 (3.3–326.2)

*Values in parentheses indicate the minimum and maximum values, respectively.

Multiple regression model (Table 2) explains 22.3% of the total variation (R^2 = 0.2227) and OLS estimation results show that log of household total expenditure ($p < 0.001$), education (log of years of schooling) ($p < 0.001$), household size ($p < 0.001$), having regular wage ($p < 0.01$), being relatively poor ($p < 0.05$), having chronic disease ($p < 0.001$) and elderly ($p < 0.001$) have positive and significant effect on oop expenditures. The only negative and significant relationship is observed on the log (years of schooling)[2] ($p < 0.05$).

Table 2. OLS Estimation results

Variables	Coefficient	Std. errors	$p > |t|$
Log (age of household head)	−0.174	0.315	0.582
Log (household total expenditure)	0.646	0.153	0.000***
Log (years of schooling)	0.976	0.322	0.003***
Log (years of schooling)^2	−0.212	0.095	0.027**
Health insurance	0.133	0.147	0.369
Regular wage/income	0.217	0.119	0.070*
Professional or semi-professional occupation	−0.079	0.121	0.509
Households with chronic disease	0.447	0.140	0.002***
Households with children between 0 and 5 years old	−0.066	0.146	0.652
Households with member over 65 years old	0.618	0.195	0.002***
Log (household size)	0.407	0.206	0.050**
Relatively poor households	0.597	0.175	0.001***
Constant	−2.776	1.617	0.088
Numbers of observation	200		
F (12, 189)	4.99		
Prob > F	0.0000		
R-squared	0.2227		
Root MSE	0.7056		

Standard errors are compatible with heteroscedastic

***Significant at 1%.

**Significant at 5%.

*Significant at 10%.

5. Discussion

The multiple regression model explains how oop health expenditure is distributed throughout the Mugla population. The most important contributor to oop expenditure is education, with the positive coefficient of 0.98. It means 1% increase in the number of years of education increases health spending by almost 1%. The relationship between education (schooling years) and health expenditure has the same direction up to a certain level of education and then it reversed. According to the literature, in the high education levels, the need for healthcare services decreases since a higher level of education contributes to health status and improves healthcare behaviour. Because it is expected that more educated individuals are more aware of their health needs and choose rational behaviour for their health as they have more economic opportunities.

Total household expenditure has a powerful positive effect on oop expenditures, too. Household total expenditure is significant at 1% level and accordingly 1% increase in household total expenditure increases household health expenditure by 0.6%. As well as the other economic factors, having a regular income by the household head has a significant contribution in explaining the amount of oop health expenditure. But the occupation status of the household head does not make a significant contribution in explaining the amount of household health expenditure. Also, there is any significant relationship between having health insurance and oop health expenditure. Considering that only two people are uninsured in the sample, it can be explained that the insurance situation does not make sense in the estimation.

In this study, households with less than half of the average income were defined as relatively poor. There is a significant and positive relationship between relative poverty and household total health expenditure in the same direction. When we consider the descriptive statistic results, the sample shows that the most of the relative poor households have a chronic disease (29 households are

relatively poor and 19 of them have chronic disease) and 83% of relatively poor households have an average schooling period of 5 years, which corresponds to the primary school level. Moreover, 16 households have elderly members over 64 aged and five of them were relatively poor. That means the relative poor households show a really high level of healthcare need. Then these households' oop health expenditure is supposed to be higher than the relative non-poor.

The presence of members with a chronic condition that requires regular use of medicines increases the health expenditure of households. Households with chronic illnesses also spend more on health. While the presence of 0–5-year-old children in households does not have a significant contribution in explaining the amount of health expenditure but the presence of individuals aged 65 and older increases oop health expenditure by 0.6%. As the current literature supports, there is a significant and positive relationship between household size and household health expenditure. 1% increase in household size increases household health expenditure by 0.4%. Beside of these demographic variables, age has any significant effect on oop expenditures.

6. Conclusion

The results strongly show that the prominent determinants of household health expenditures are education, expenditure level, poverty, getting regular income, having chronic disease and elderly member. These findings show that demographic, socio-economic and health care need factors are important to explain the amount of oop health expenditures among the households in Mugla. Besides, the vulnerable households with economic disadvantages have to pay more on health expenditures for their health need even they have health insurance. That means, the coverage especially for relatively poor households is needed to be expanded and their access to health services should be eased, since most of the poor suffers from the chronic illnesses. Also the characteristics of health care need such as having chronic disease and elderly in the households increases the amount of oop payments more according to healthier households. In conclusion, the vulnerable groups are suffered more from health expenditures in Mugla. When we generalize this finding for the health care system, we should say that financial equity has not been achieved in the survey years. Since 2011, when this field research was conducted, two important applications have been implemented within the scope of Health Transformation Program. These are the merging of different insurance systems under one roof and introducing the user payments. The first of these practices facilitated access to health care and increased the use of health services. But the user payments put into practice have been significantly increased in recent years and the application area has been widened. Since the current survey was studied in the period just before the transformation on the health care finance system in Turkey, it may provide a comparison for the further studies which examine the effects of these new policies on the household health expenditures. To produce effective health policies, household health expenditures is also needed to be investigated in the context of health expenditure items (such as medicine, transportation, surgery, in-patient and out-patient services) and chronic diseases in detail.

References

Ahmed, S. (2006). *Catastrophic out-of-pocket healthcare payments for rural households in Bangladesh: potential impact of introducing user fees* (Unpublished PhD Thesis), Tulane University Department of International Health and Development, New Orleans, LA.

Akin, J.S., Guilkey, D.K. & Denton, E.H. (1995). Quality of services and demand for health care in Nigeria: a multinomial probit estimation. *Social Science and Medicine, 40*, 1527–1537. doi: 10.1016/0277-9536(94)00274-w

Basumataru, J. & Srivastav, N. (2017). Out of pocket health care expenditure and the poverty trend in the seven sisters and the Himalayan State of India. *Asian Journal of Research in Social Sciences and Humanities, 7*(10), 560–572. doi: 10.5958/2249-7315.2017.00526.3.

Correa-Burrows, P. (2012). Out-of-pocket health care spending by the Chronically Ill in Chile. *Procedia Economics and Finance, 1*, 88–97. doi: 10.1016/S2212-5671(12)00012-3.

Feldstein, P. (1993). *Healthcare Economics* (4th ed.). NY, Albany: Delmar Publishers.

Giovannis, E. & Ozdamar, O. (2017). The effects of the 2008 health reform on out-of-pocket health expenditures in Turkey. *Akdeniz I.I.B.F. Dergisi, 36*, 71–102.

Hotchkiss, D.R., Hutchinson, P.L. Malaj, A. &Berruti, A. A. (2005). Out-of-pocket payments and utilization of health care services in Albania: evidence from three districts. *Health Policy, 75*(1), 18–39. doi: 10.1016/j.healthpol.2005.02.003.

Islek, D., Kilic, B. &Akdede, B.B. (2018). Out-of-pocket health expenditures in patients with bipolar disorder, anxiety, schizophrenia and other psychotic disorders: findings from a study in a psychiatry outpatient clinic in Turkey. *Social Psychiatry and Psychiatric Epidemiology, 53*, 151–160. doi: 10.1007/s00127-017-1465-y.

Lahiri, K. & Xing, G. (2001). *An econometric analysis of veterans' health care utilization using two-part models* (Discussion Papers 01-13). Albany, NY: University at Albany, Suny, Department of Economics.

Liu, Y., Celik, Y. & Sahin, B. (2005). *Turkiye'de Saglik ve Ilac Politikalari, Turkiye'de Saglik/Ilac Harcamalari ve Ilac Geri Odeme Politikasi*, Eylul.

Mahumud, R.A., Sarker, A.R., Sultana, M., Islam, Z., Khan, J. & Morton, A. (2017). Distribution and determinants of out-of-pocket healthcare expenditures in Bangladesh. *Journal of Preventive Medicine and Public Health, 50*(2), 91–99. doi:10.3961/jpmph.16.089.

Mills, A. & Gilson, L. (1988). Health economics for developing countries: a survival kit. *HEPF Working Paper*, London School of Hygiene and Tropical Medicine, London, UK.

MoH. (2017). *Plan and Budget Presentation: 2018*, Ministry of Health. Retrieved March 15, 2019, from https://sgb.saglik.gov.tr/Shared%20Documents/2018_Yili_Plan_Butce_Sunumu_14_11_2017.pdf

MoH. (2018). *General health statistics, summary information, office of statistics, analysis and reporting*. Ministry of Health. Retrieved December 4, 2018, from https://rapor.saglik.gov.tr/istatistik/rapor/

Mwandira, R. (2011). *Examining equity in out-of-pocket expenditures and utilization of healthcare services in Malawi Corvallis*. Oregon, OR: Oregon State University.

Narang, A.K. & Nicholas, L.H. (2017). Out-of-pocket spending and financial burden among medicare beneficiaries with cancer. *JAMA Oncology, 3*(6), 757–765. doi:10.1001/jamaoncol.2016.4865.

Oz, E. (2008). *Ulusal Hanehalkı Cepten Saglik Harcamalarinin Finansmanda Dikey Hakkaniyet Acisindan Degerlendirilmesi* (PhD Thesis). Hacettepe University, Institute of Social Sciences, Ankara, Turkey.

Ruger, J.P. & Kim, H.J. (2007). Out-of-pocket healthcare spending by the poor and chronically Ill in the Republic of Korea. *American Journal of Public Health, 97*(5), 804–811. doi:10.2105/AJPH.2005.080184.

SGK (2019), The Institute of Social Security, Statistical Year Book of 2017. http://www.sgk.gov.tr/wps/portal/sgk/tr/kurumsal/istatistik/sgk_istatistik_yilliklari

Sozmen, K. & Unal, B. (2013). *Determinants of out of pocket health expenditure in Turkey*. 6th European Public Health Conference, Saturday 16 November.

Todd, S. (2001). *Who pays for privatization? An analysis of out-of-pocket health care spending in Canada, 1969–1996* (Master of Arts) Department of Sociology, University of Manitoba, Winnipeg, MB.

Turkstat. (2002). *Household budget survey, 2002*. Ankara, Turkey: Statistical Office of Turkey.

Wang, W., Temsah, G. & Carter, E. (2016). *Levels and determinants of out-of-pocket health expenditures in the democratic republic of the Congo, Liberia, Namibia and Rwanda*. Maryland, MD: ICF International Rockville.

Yardim, M.S., Cilingiroglu, N. & Yardim, N. (2014). Financial protection in health in Turkey: the effects of the health transformation programme. *Health Policy and Planning, 29*, 177–192. doi: 10.1093/heapol/czt002.

You, X. & Kobayashi, Y. (2011). Determinants of out of pocket health expenditure in China: analysis using China health and nutrition survey data. *Applied Health Economics and Health Policy, 9*(1), 39–49. doi: 10.2165/11530730-000000000-00000.