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Determinants of Turkish households' out-of-pocket expenditures on three categories of health care services: A multivariate probit approach

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Abstract

This study identifies the driving forces that contribute to the probabilities of incidence of out-of-pocket (OOP) expenditures by households in Turkey. Factors affecting the probability of OOP expenditures on medical products/devices/supplies (MP), outpatient services (OTS), and inpatient services (ITS) are examined using the Household Budget Survey data gathered by the Turkish Statistical Institute in 2018. The study applies the multivariate probit model. The incidence of OOP spending varied with 48.9% of the households reporting OOP expenditure on MP, 22.4% on OTS, and 25.4% on ITS. The largest probability changes were associated with household disposable annual income, household type and size, age category, and having private health insurance. Gender and marital status also influenced expenditures in some categories. Lifestyle choices had small and mixed effects, with smoking and alcohol consumption lowering the probability of OOP spending. From a policy standpoint, households with the lowest incomes, large households, and those where the household head was 'others' (retiree, student, housewife, not actively working, etc.) or had a condition preventing employment seemed to report OOP expenditures less frequently and may have chosen not to receive healthcare services, leading to the need for more healthcare services later.

KEYWORDS
household budget survey, inpatient services, multivariate probit, out-of-pocket expenditures, outpatient services

Highlights

- Singles, never married, of productive age unlikely to spend out-of-pocket (OOP) on healthcare.
- Households from higher income quartiles have much higher probability of OOP spending.
- Having private health insurance markedly increases probability of OOP spending.
- Smoking and alcohol use lowers OOP spending probability, except for in-patient care.

1 | INTRODUCTION

The acquisition of healthcare services commonly requires payment.[1] Both public and private schemes provide healthcare financing. Public healthcare is financed by payroll collections itemised as social health insurance and transferred by employers to the government. Private financing instruments consist of out-of-pocket (OOP) payments, private health insurance, and medical savings accounts.[2] The purpose of healthcare financing is to ensure access to private and public health services.[3]

Well-planned healthcare system financing protects society against financial risks. The costs of healthcare services are increasing rapidly due to the growing elderly population, chronic diseases, and technically more complicated, costly treatments.[4] The way healthcare systems are designed, managed, and financed affects the lives and livelihoods of individuals.[3] The threat of OOP payments to the household living standard is increasingly considered in health financing.[4] The out-of-pocket payment is the dominant form of financing healthcare services in developing countries[5] including the Middle East and North Africa (MENA).[6–8] Providing financial protection against excessive OOP is an important policy. OOP expenditure is an issue that policymakers focus on because of the consequences for patients, their households, and society.[9]

Out-of-pocket expenses constitute an important obstacle in access to health services.[10] Access to health services depends on the economic status of individuals or households. If the health service cost is not affordable, it prevents receiving needed care.[5] Borrowing money, selling assets, or using other funds to receive healthcare services are some approaches used by households. Households may choose the least-cost care or completely forgo the healthcare services they need.[11] Some perceive the OOP payments as unfair.[12] One of the main purposes of both national and international healthcare policy is to replace OOP payments with alternative forms of financing.[13,14]

Household OOP expenditures for healthcare services accounted for 23% of total global health expenditures and 45% of health expenditures in developing countries between 1999 and 2003.[15,16] Household health expenditure information is essential to formulate a country's effective health system financing policy.[4,17] Health-related out-of-pocket expenses can force people to choose between health spending and other basic needs,[18] can expose households to large medical expenses, and push them into poverty.[19] It is estimated that 25 million households or more than 100 million people have been pushed into poverty due to out-of-pocket health expenditures[20] worldwide. Between 2000 and 2015, out-of-pocket health expenditure has increased the share of households facing poverty from 1.8% to 2.5%.[18] Large OOP spending limits other basic household needs, potentially contributing to malnutrition. Combined negative effects make OOP spending a major social problem and a major concern for policymakers.[9,21] Some opine that OOP expenditures are an unfair, inefficient, and regressive form of healthcare financing.[22]

Out-of-pocket spending on healthcare is the primary source of financing next to public health expenditures in terms of the amount and percentage of total expenditures in most countries.[23] OOP expenditures, referring to the payments made by households in exchange for healthcare services, have been increasing in the last 2 decades in Turkey.[24] OOP payments for treatment, pharmaceuticals, and other services and supplies reached 28,655 billion Turkish lira, increasing by 19.4% in 2018 alone. The share of OOP payments in total health expenditures was 17.3% in Turkish households in the same year.[25] Most studies analysing the determinants of OOP expenditures in developed and developing countries have focussed on spending levels or separate probabilities for outpatient and inpatient services (ITS).[13,26] The studies on determinants of OOP expenditures in Turkey examined total expenditures.[27–30] A few studies focussed on specific diseases[24] or health insurance status.[31] None, however, examined spending on different categories of healthcare expenditures.

The pattern of expenditures on different types of OOP can vary. For example, individuals with similar health conditions may spend differently for a variety of reasons. There may also be variations due to different insurance coverage, health conditions that may affect the treatment needed, as well as the amount of money that the individuals can pay out of pocket. For those reasons, all needed healthcare may not be received, while a medically unnecessary treatment may be received without the patient's knowledge.[32] As households choose to access and benefit from health services, OOP expenditures may increase but they may not be protected against costs incurred due to high medical care costs.[33] Meanwhile, families or individuals maintaining an unhealthy lifestyle were observed to experience higher costs compared to their peers with healthier lifestyles.[34] For example, the main underlying causes of chronic diseases, especially non-communicable diseases, are unhealthy eating habits and physical inactivity.[35] Such behaviours can have an impact on healthcare utilization and place a heavy burden on healthcare providers.[36]

This study recognises that healthcare involves services and supplies and distinguishes the OOP spending on three categories: medical products, supplies, and materials (MP), outpatient treatment services (OTS), and inpatient treatment services (ITS). The current study uses nationally representative data to identify a wide range of statistically significant factors that are causally related to household OOP expenditures for three service categories (MP, OTS, and ITS) in Turkey. Splitting OOP into the three categories helps to develop health policies that will ensure effective, sustainable, and rational resource allocation. Besides the classification of types of expenditure, another important contribution is that the methodological approach considers the realities faced by patients and households by adopting a simultaneous modelling framework. The framework allows consideration of the relationship between the three categories of OOP expenditures. The likelihood of household spending on MP, OTS, and ITS and the possibility of the simultaneous occurrence of those services have been ignored in the literature.[4,5,27,37–44] The monthly OOP spending on, for example, medical products, undoubtedly affects other healthcare services. Therefore, studies that lack such a relationship between the amount of expenditure or the probability of exposure to such expenditures may ignore some important statistical properties if an appropriate estimation method has not been applied.

The current study expands the existing literature by identifying the factors that may be in a causal relationship with household OOP expenditures. Additionally, behavioural characteristics of the family were included in the model and their causal effect on the family's OOP spending was investigated. Knowing the causal determinants of out-of-pocket expenditure types provides important insights for accessibility to vulnerable groups, classification of expenditure types, and planning of healthcare system interventions or changes. In light of all the above information for providing reliable evidence to policy makers, the purpose of this study is to identify the key factors that exhibit a causal relationship with any type of OOP spending and, possibly, to discern changes in the probability of a household's exposure to such spending. To our knowledge, such a study marks a first in the country and is a unique contribution to the literature. Statistical determination of the triggers of expenditure probability, together with their direction and effects, can provide an on-site comparison between health expenditure types. It is also thought that the classification of expenditure types will provide politicians and other interested parties with a holistic understanding of how expenditure probabilities are determined. The multivariate probit model (MP) was used to examine the pass-through between correlated OOP spending types by obtaining correlation coefficients and to investigate the factors that have statistical causality with different types of spending probability. The application of the multivariate probit

regression (MPR) analysis accommodates the likelihood of the OOP expenditures in one category being influenced by those involving another category of healthcare service. The approach allows the identification of factors influencing the expenditure in each category from a large pool of socio-demographic and economic characteristics of the household and the household head providing superior insights applicable in the formation of healthcare policies. The practical recommendations for policy makers are generated from the calculation of the marginal effects (ME) of regressors derived from the joint probabilities. The quantified measures, that is, the probability changes that expenditures in a specific category took place, are a meaningful guide for health practitioners and decision-makers in redesigning health expenditures and their fair redistribution across the country.

2 | LITERATURE REVIEW

Most studies analysing the determinants of OOP expenditures focus on total expenditures, whereas only a few studies focus on out-of-pocket expenditures for outpatient and/or inpatient care services. Some studies further classify out-of-pocket spending data.[10,13,26,34,45–49] A separate group of studies examines expenditures associated with a specific disease[24,37,50,51] or such services as child care, maternal care, prenatal care, or maternity.[52–55]

Household expenditures on health services vary according to conditions. There may be differences between receiving inpatient treatment or outpatient treatment according to the seriousness of the disease, and whether coverage involves public or private health insurance.[10,56–58] Several determinants affect OOP expenditures based on the number and type of OOP expenditure categories.[16] These vary according to the country's economic development status.[35] The type of insurance for physician services and medication was determined to affect OOP expenditures.[47] The insured generally spend less on outpatient and inpatient treatment services.[49] However, in studies on the expenditures made for the treatment of primary healthcare services, the expenditures of insured individuals were determined to be higher.[59,60] Having health insurance was also found to increase out-of-pocket pharmaceutical expenditures for self-medication.[34]

In many studies conducted in both developed and developing nations, socioeconomic and demographic factors, as well as health-related characteristics, are among the potential causes of OOP expenditures.[37,41,61–65] Household income is an important determinant of OOP expenditure.[4,39,66] The higher the income, the higher the utilization of healthcare services and out-of-pocket expenditures.[47,63,67,68] Being in the lowest income bracket negatively affects the probability of spending out-of-pocket on healthcare.[37,69–71] Employment status can also affect OOP expenditures.[41,72] The employed are more likely to incur OOP expenditures than the unemployed,[42] that is, unemployed OOP expenditures are lower.[39] However, some studies find that the unemployed have higher out-of-pocket expenditures on healthcare.[9,24]

Several studies report a causal relationship between OOP expenditure and gender.[48,67] In India[41] and Bangladesh,[40] men were found to have higher OOP expenditures than women. However, in Ivory Coast,[73] Pakistan,[5] Chile,[37] and Tanzania,[74] women were found to have higher OOP expenditures than men. Similarly, age is among the causes of OOP spending.[35,75] The increase in age was found to lead to increased spending for adults.[64,74] Another variable that has a causal relationship with OOP spending is undoubtedly the person's education.[50,76] OOP expenditures increase with the education level of the household head.[63,72] The share of out-of-pocket expenditure, on the other hand, was observed to have decreased in households with well-educated members.[31,57] A situation that cannot be ignored is the existence of causality between marital status and OOP expenditures.[77,78] Some studies report that the married[27,67,74] and widowed[79] tend to have higher OOP expenditures.

The residence location is also considered among the possible causal factors of out-of-pocket expenditures.[39] Residing in rural or urban areas results in differences in out-of-pocket health expenditures.[13,38,80–82] Also among the determinants of OOP expenditures is the size of the household.[30,44,83] The greater the number of household members, the more OOP expenditures.[37,60,64,84] Factors such as the presence of children and elderly members in the household were also found to influence OOP expenditure.[5,38,65] Their presence was reported to increase the

probability of out-of-pocket spending on healthcare.[7,35,62,85] As a critical determinant of health expenditures, special attention is paid to insurance, a social security factor.[38] Social security has a decisive effect in reducing the health expenditure of individuals and households.[9,86]

Besides the demographic and socioeconomic factors, disease-related factors affect OOP expenditures.[87,88] The presence of chronic diseases among household members causes an increase in household healthcare expenditures.[4] Hearing impairment and disability are associated with higher OOP expenditures in adults.[74] The presence of any obstacle that restricts life activities also causes increased OOP expenditures.[60] In addition, factors such as the type of healthcare facility visited[42,48] and proximity to service providers were found to determine OOP expenditures.[41]

3 | OVERVIEW OF THE TURKISH HEALTH SYSTEM

Turkey is an upper-middle-income country with a population of 83.4 million, a Gross Domestic Product (GDP) of $720.1 billion in 2020, and a per capita GDP of $8,635.[89] Turkey maintains a mixed financing system in healthcare services. Healthcare services are basically either financed in the form of taxes, social security contributions collected by the Social Security Institution for the beneficiaries of General Health Insurance (GHI), private health insurance, or are covered by out-of-pocket expenditure.[90] The country's healthcare financing system experienced serious problems throughout the 1990s.[91] With the fragmented insurance system, low coverage for the poorest segment of the population, and high out-of-pocket expenses, the healthcare system has been perceived as inequitable and inadequate. Unbalanced and inadequate funding hindered access to healthcare services for the impoverished. Their vulnerability to healthcare expenditures was exacerbated by the absolute scarcity of healthcare service infrastructure.[92] Already in the 1990s, the country's healthcare expenditures were lower than in other Organisation for Economic Co-operation and Development countries, and healthcare indicators were lower than in other European countries.[93]

Healthcare financing and provision was highly fragmented before 2008 and was administered by three social security institutions.[31,93] Retired civil servants were covered by the Government Employee Relief Fund. The healthcare services of active civil servants were financed from the state budget. Private sector employees in the registered sector and blue-collar public employees were covered by the Social Insurance Organization (SIO), whereas the self-employed, including those working in agriculture, were covered by Tradesmen and Craftsmen and Other Self-employed Social Insurance Institution. There also was a Green Card programme for poor households who could not be included in the health insurance system by any other means. Various aid packages were provided to beneficiaries of that government-funded programme.[94,95]

The healthcare system has undergone significant changes in terms of both delivery and financing of healthcare services following the reform launched in 2003, called the Health Transformation Programme (HTP). The programme combined three different insurance schemes to address deficiencies as well as poor outcomes in the healthcare system.[85,94] Although the formal merging occurred in 2008, efforts began in 2004 to make the scope of the insurance plans the same.[31] Health Transformation Programme has significantly reduced healthcare inequality between different social groups.[92] Healthcare system reforms have been effective in improving primary health outcomes and providing financial protection, especially for disadvantaged groups.[96] While in 2003 only 66.3% of the population was covered by social security, the rate reached 86% in 2018, making the country relatively socially inclusive.[92,97]

The integration of the fragmented infrastructure of healthcare financing resulted in a unified health insurance system, and the GHI law became effective in 2006 and compulsory in 2012.[92] Under the new system, the contribution is 12.5% of anemployee's gross income, of which 7.5% is paid by the employer and 5% by the employee. For those who only rely on the GHI, the rate is 12% of their earnings and the state contributing 3% of the insured earnings (based on the premiums).[91] Compulsory insurance has been initiated under GHI and everyone not covered by social security or who is not a dependent of a GHI holder, as well as those who fall outside the scope of Law No. 5510, were covered by GHI. Approximately 10.5 million individuals were registered under this regulation in 2018 or 13.1% of the population.[97] Universal coverage was one of the main targets of the HTP and GHI and ensures social

security for everyone in Turkey.[95,98] Healthcare financing system reform addresses financial protection of disadvantaged groups.[99] The low share of OOP expenditures in total healthcare expenditures 3 years after HTP showed that the unification was successful in improving healthcare financing.[100]

Household healthcare expenditures constitute a significant proportion of total private healthcare expenditures. While the share of households in private-sector healthcare spending was lower before and immediately after the HTP, it later increased and has continued to grow in almost every period. The share of households in private sector healthcare expenditures, which was 68% in 2002, increased particularly after 2010 and reached 77% in 2018. Although social insurance expenditures increased in parallel with the population covered, no significant decrease was observed in the share of household spending. Households continued to spend within the social insurance system by financing it through premium payments[25,95] but still had to pay some out-of-pocket. Before the GHI enforcement, a participation fee of 10% and 20%, respectively, was paid for drugs and medical supplies. However, there are currently, additional payment obligations over 10 different items which add up to three times the SIO payments.[90,101]

The new healthcare policies may have affected some sectors and OOP spending may have changed accordingly.[31] Access to general healthcare services has gradually improved throughout the reform process, but after the implementation of the GHI, 9% of people still reported that their needs were not met due to healthcare costs in 2013.[94] Some recent studies have shown that OOP expenditures affect disadvantaged groups in Turkey and, within the scope of GHI coverage, differently affect various income groups. Healthcare reforms improve access to healthcare services and reduce the incidence of serious healthcare conditions, but higher-income households, in particular, seem to have benefited from these reforms.[31] In another study examining the level of financial protection from healthcare expenses in the country, the level of exposure to OOP expenditures and the frequency of expenditures have increased among those covered by the GHI.[85,102]

Some individuals covered under the social insurance system seek services from private hospitals for different reasons. For example, their expectations regarding services were not met by their public healthcare provider. In such cases, individuals or institutions insure against health risks by relying on private health insurance companies, one of the alternative methods of healthcare financing.[103] Due to the low level of private health insurance utilization in Turkey, OOP expenditures are significantly higher.[104] In 2018, the share of private health insurance subscribers in Turkey was 10.9%, which corresponds to only 3.8% of the population.[102] The 2% share of private health insurance in total health expenditures in Turkey is limited compared to developed countries. Those who can afford private health insurance, however, correspond to 10% of the population, which suggests a significant potential.[105]

4 | DATA AND METHODS

4.1 | Data source

The study applies data from the Household Budget Survey (HBS) conducted by the Turkish Statistical Institute (TSI) in 2018. The HBS data provide information on household socio-economic structure, standards of living, and consumption patterns and are used to test the viability of the socio-economic policies being implemented. The survey was conducted between January 1st and 31 December 2018, among a total of 1296 households, the number of which varied each month.

The first stage of sampling involved the selection of blocks from the National Address Database. Blocks were chosen from among urban areas, rural areas with a municipal organization, and villages, with a probability weighting proportionately to the size of the settlement. Next, the specific addresses from each block were systematically selected. The household at the selected address was defined as the final sampling unit. The stratified two-stage cluster sampling method was used. In case the data could not be obtained from the selected household, the 'non-response form' was filled and the weight coefficients were calculated. The non-response rate in the 2018 HBS was

23.9%. The sampling structure of the 2018 HBS was fitted to provide nationwide estimates. The applied weight coefficients were calculated according to current projections of the future population.[106]

The HBS questionnaire consisted of three separate parts: the household section included questions regarding housing information, assets, vehicles, and real estate; the individual questionnaire included questions regarding household composition, employment status, employment information, income types, and income status; the third part focussed on household consumption expenditures. In the second part of the questionnaire, the person responsible for the household (head) was indicated. Questions in part one and part three, (household questions and information on consumption expenditures) were answered by the household head. The three Excel files were combined into a single data file, taking into account that the responses were from the same household head.[106]

The HBS survey included a total of 11,828 households in 2018. Because there were no missing answers, all data were used in the estimation of the MPR model.

4.2 | Choice of estimation approach

The study focuses on quantifying factors associated with OOP expenditures on the three distinct categories of healthcare services. Classification of the services is based on the discernible character of the services such as medication or outpatient treatment, but the study recognises that household use of services implies a simultaneous or nearly simultaneous incidence of their purchase. The MPR technique is preferred when dependent variables are related to each other and has been, therefore, selected for the estimation. When some of the dependent variables are interrelated through the same set of explanatory variables, the MPR results are more robust than binary logit or probit results obtained using a separate equation for each dependent variable[107] or one of the categories of healthcare services. The general specification for the trivariate probit regression is[108]:

$$\begin{aligned} y^*_{im} &= x'_{im}\beta_m + \varepsilon_{im} \\ y_{im} &= 1 \ \text{if} \ y^*_{im} > 0 \ \text{and} \ 0 \ \text{otherwise} \quad \text{for} \ i = 1,\ldots,N \ \text{and} \ m = 1,2,3. \\ E\left[\varepsilon_m \mid x_m\right] &= 0, Var\left[\varepsilon_m \mid x_m\right] = 1, Cov\left[\varepsilon_j \varepsilon_m \mid x_m\right] = \rho_{jm} \ and \left(\varepsilon_1, \varepsilon_2, \varepsilon_3\right) \sim N\left[0, R\right] \end{aligned} \tag{1}$$

where y^*_{im} is a latent dependent variable for each m, while y is its observed counterpart. A set of independent variables is x and assumed to be the same in each equation, β is a set of the associated regression coefficients to be estimated, and ε_m is an error term for each equation. R is the variance-covariance matrix with values of one on the leading diagonal and correlations $\rho_{jm} = \rho_{mj}$ as off-diagonal elements. Log-likelihood function for a sample of N independent households:

$$\log - L = \sum_i w_i \log \Phi_3\left(\mu_i; R\right), \tag{2}$$

where w_i is the weight computed by the TSI for a household and $\Phi_3\left(\mu_i; R\right)$ is standard trivariate normal cumulative distribution function (CDF), where $K_{im} = 2y_{im} - 1$ for each i, m = 1,2,3. If the remaining dependent variables (say, y_2 and y_3) are equal to 1, then the conditional expectation of the other dependent variable (say, y_1) is given:

$$E\left[y_1 \mid y_2 = 1 \, and \, y_3 = 1\right] = \frac{\text{Prob}\left(y_1 = 1, \ldots, y_3 = 1\right)}{\text{Prob}\left(y_2 = 1, y_3 = 1\right)}, \tag{3}$$

where the numerator is the trivariate CDF, while the denominator is the bivariate CDF. The remaining two conditional expectations can be constructed likewise. The effect of any regressor on the conditional probability is calculated by differentiating such conditional probability for the corresponding regressor. If Σ is the asymptotic covariance matrix for the coefficient estimates, then the variance of the predictor of ME is obtained as the mean square deviation of 100 random draws from the distribution of the underlying slope parameters.[109]

To test the robustness of the final model parameters, 50% and 75% percent of the data were randomly selected and run with the MPR. The contribution of each observation to the Akaike Information Criteria (AIC) was then calculated. The calculated values are compared to the values in the final model that used all data. The high similarity of the calculated AIC values (3.297, 3.262, and 3.268 for 50%, 75%, and 100% of data, respectively) show the parameters derived from our final model are robust. Additionally, the similarity of the parameters suggests the stability of the parameters of the final model (the results are available upon request).

The choice of estimating the model using the multivariate probit is confirmed by the statistically significant correlation coefficients. The correlation coefficients indicate a positive relationship between the dependent variables and justify the estimation of a single model. The null hypothesis that the correlation coefficients were simultaneously zero was rejected (Likelihood Ratio (LL) test value is 2750.78 with 3 (df) and $p < 0.001$). Also, the LL test revealed that all explanatory variables used in the three-equation system are simultaneously nonzero, and the regressors jointly explain each probability decision (LL is 985.96, df = 147, and $p < 0.001$). From a policy standpoint, that result establishes there is interaction across the three equations and the incidence of spending on one of the three categories can be associated with expenditures on the remaining two categories.

4.3 | Outcome variables and covariates

The dependent variables in the current study include OOP expenditures for three healthcare service categories: MP, OTS, and ITS. Each dependent variable is binary, that is, coded as '1' if the household incurs any OOP expenditures for a specific category, otherwise coded '0'. The MP category includes the probability of spending on pharmaceutical products, pregnancy tests, contraceptive mechanical devices, medical products not classified elsewhere, corrective eyeglasses and contact lenses, hearing aids, repair of therapeutic instruments and equipment, and other therapeutic instruments and equipment. The second category, OTS, considers the likelihood of household OOP spending on general practitioners, specialist physicians, dental services, medical analysis laboratory and x-rays, spa services, corrective gymnastic treatment, ambulance services, leasing of therapeutic equipment, and other paramedical services. Finally, the ITS category considers expenditures on hospital stays.

The selection of independent variables for the model was based on Andersen's Behavioural Model,[110,111] literature review on determinants of out-of-pocket healthcare expenditure,[5,27,30,37–39,42,62,63,85,112,113] and data availability.

The behavioural model, developed by Andersen, classifies the factors that determine the use of health services as 'Predisposing', 'Enabling', and 'Need'. The predisposing factors are characteristics such as age, gender, marital status, education, occupation, religion, ethnicity, family size, household characteristics, past illness, knowledge about illness, and attitudes towards healthcare; enabling factors, also known as facilitators, including income, health insurance, location, access to healthcare providers, price of healthcare and other community-level factors; and need factors refer to a disability, disease symptom, severity, and diagnosis.[110,111]

The variables selected in the current study as the determinants of out-of-pocket health expenditures include gender,[48,67,114,115] education level,[37,38,72,116] age,[57,113,117] marital status,[77,116] occupation,[41,74,118] work preventing condition,[43,60,119] household income,[73,112,120–122] household type,[123,124] compulsory health insurance,[24,42,85,116,117] private health insurance,[124,125] credit card,[126] having savings,[127,128] household lifestyle choices,[34,49,112,129] ownership of household residence and housing characteristics,[42,130] and household size.[4,27,30,60,64,84,114,117]

Ordinal and nominal variables were defined as dummy variables in order to observe the effects of the categories of all variables to be included in binary logistic regression models.[131] Table 1 shows the definitions of explanatory variables and descriptive statistics.

TABLE 1 Descriptive statistics of all variables

Variables	Frequency (n = 11,828)	Percent	VIF
Discrete variables			
Demographic characteristics			
Gender:			
Female (Reference group)	1826	15.4	-
Male	10,002	84.6	2.65
Education Levels:			
Incomplete primary school (Reference group)	1317	11.1	-
Primary school	4976	42.1	3.35
Secondary school	1720	14.5	2.55
High school	2041	17.3	2.98
College	1774	15.0	3.68
Age categories:			
15–24 years	122	1.0	1.22
25–34 years	1578	13.3	2.81
35–44 years	2765	23.4	3.40
45–54 years	2825	23.9	2.83
55–64 years	2345	19.8	1.94
65 + (Reference group)	2193	18.5	-
Marital status:			
Never married	479	4.0	2.29
Married (Reference group)	9662	81.7	-
Divorced/Widowed	1687	14.3	4.27
Occupation categories:			
Manager	561	4.7	1.39
Professional occupation groups	676	5.7	1.89
Technicians/administrative assistant	431	3.6	1.32
Office service employee	377	3.2	1.27
Service/sales staff	1338	11.3	1.62
Skilled agriculture/forestry/aquaculture workers	1482	12.5	1.54
Artists/professionals	1211	10.2	1.65
Facility managers/machine operators/installers	956	8.1	1.54
Occupations with no skill requirement	884	7.5	1.41
Others (retiree, student, stay-at-home female, not actively working, etc.) (Reference group)	3912	33.1	-
Work preventing condition:			
Yes	824	7.0	1.14
No (Reference group)	11,004	93.0	-
Socioeconomic characteristics			
Household disposable annual income quartiles:			

(Continues)

TABLE 1 (Continued)

Variables	Frequency (n = 11,828)	Percent	VIF
1st quartile (Reference group)	2957	25.0	-
2st quartile	2957	25.0	1.76
3st quartile	2957	25.0	2.18
4st quartile	2957	25.0	3.08
Household type:			
Single-person household	1149	9.7	4.34
Nuclear family of spouses only	2228	18.8	1.98
Nuclear family of spouses and children (Reference group)	5884	49.7	-
Nuclear family of single parent and children	837	7.1	2.77
At least one nuclear family and other persons	1544	13.1	1.53
Consisting of more than one person without a nuclear family	186	1.6	1.63
Second-home ownership:			
Yes	995	8.4	1.06
No (Reference group)	10,833	91.6	-
Compulsory health insurance:			
Yes	11,219	94.9	1.05
No (Reference group)	609	5.1	-
Private health insurance:			
Yes	1532	13.0	1.37
No (Reference group)	10,296	87.0	-
Credit card:			
Yes	5935	50.2	1.48
No (Reference group)	5893	49.8	-
Savings:			
Yes	4540	38.4	1.44
No (Reference group)	7288	61.6	-
Household lifestyle choices			
Smoke:			
Yes	6186	52.3	1.18
No (Reference group)	5642	47.7	-
Drink alcohol:			
Yes	667	5.6	1.11
No (Reference group)	11,161	94.4	-
Eat out:			
Yes	6241	52.8	1.43
No (Reference group)	5587	47.2	-
Cinema, theatre, sports, games, etc.:			
Yes	1006	8.5	1.21
No (Reference group)	10,822	91.5	-

TABLE 1 (Continued)

Variables	Frequency (n = 11,828)	Percent	VIF
Play games of chance:			
Yes	513	4.3	1.06
No (Reference group)	11,315	95.7	-
Frequents coffeehouse, cafe, lounge, etc.:			
Yes	3311	28.0	1.16
No (Reference group)	8517	72.0	-
Shops at market:			
Yes	7502	63.4	1.09
No (Reference group)	4326	36.6	-
Shops online:			
Yes	1208	10.2	1.29
No (Reference group)	10,620	89.8	-
Housing			
Residential status:			
Homeowner (Reference group)	7184	60.7	-
Tenant	2764	23.4	1.41
Detached house	187	1.6	1.09
Not a homeowner but not paying rent	1693	14.3	1.16
Housing type:			
Detached house (Reference group)	5086	43.0	-
Apartment	6742	57.0	1.46
Continuous variables			
	Mean	**Standard dev.**	**VIF**
Equivalent household size	2.06	0.73	2.84
Number of rooms in residence	3.56	0.85	1.16

Abbreviation: VIF, variance inflation factor.

5 | RESULTS

5.1 | Summary statistics

The sample used in the current study shows that 48.9%, 22.4%, and 25.4% of households reported OOP expenditures for MP, OTS, and ITS, respectively. Interestingly, the spending incidence on the MP category is roughly twice that of the other two service categories. The spending frequency in the OTS and ITS categories was similar. Table 1 shows the frequency and percentage of demographic, socioeconomic, lifestyle, and housing factors in the HBS sample.

Table 1 also shows the variance inflation factor (VIF) values calculated for each characteristic to be used in the estimation of equations modelling the likelihood of incidence of OOP expenditures in the three categories. Variables with a VIF value of 5 but less than 10 are considered to indicate a moderate degree of multicollinearity, while those with a VIF value of 10 and higher show a high degree of multicollinearity.[132] However, none of the variables included in the modelling has a VIF value of five or higher (Table 1) indicating the absence of moderate or severe multicollinearity between the selected regressors.

5.2 | The MPR estimation results

Table 2 shows parameter estimates of the maximum likelihood function, along with their statistics and ME for OOP expenditures in the three categories (MP, OTS, and ITS). Most of the demographic and socio-economic characteristics affect the probability of OOP health expenditures in each of the three categories (Table 2). Specific effects have distinct magnitude and sign in each category of the OOP expenditure. The estimated coefficients lack practical interpretation until they are converted into measures of probability change in the incidence of the category-specific OOP expenditure. The individual ME of explanatory variables on OOP health expenditure are interpreted assuming all other variables are constant.

Male-headed households are less likely to incur OOP expenditures for all categories of healthcare services. The result coincides with earlier findings that women have higher health expenditures.[5,67,74] Women consume additional healthcare services due to pregnancy. Women also tend to spend more on all three categories than men because of concerns about the health of family members, including children.[67] Considering household income, households in the lowest quartile are covered by the government's GHI, but additional programs could protect that group from OOP expenditures.

The educational attainment level may affect the OOP expenditure decision in a specific category because education shapes health-related behaviour. In this study, households with a head holding any degree of education are more likely to spend OOP in the MP, OTS, and ITS categories than households headed by the non-educated. However, the effect is statistically significant only in the case of MP expenditures. The results differ from earlier findings in other countries,[5,35,50,72,133] possibly because OTS and ITS expenses can be covered by health insurance owned by family members. The positive link between education and OOP health expenditures was common in previous studies.[5,35,50,72,133] On the other hand, one could expect that the higher the education level, the lower the probability of spending by category, given that those with more education make healthier lifestyle choices,[31] and have more knowledge to better cope with illnesses or injuries.[13]

Household heads in four age categories (ranging from 25 to 64 years of age) were less likely to make OOP expenditures for both the MP and OTS categories. A similar tendency is shown for OOP spending on ITS for those in age groups 45–54 and 55–64 as compared to households headed by those 65 years old or older. The probability of OOP spending decreases as the household head age falls between 45 and 54 years of age, and the probability decrease is lowest for those 25–34 years of age as compared to those 65 years of age and older. Among the three categories, health expenditure for MP has the highest probability, while spending on the ITS category is the lowest in families. It is plausible that the ITS expenditures are covered in full or in part by insurance. However, a fully-fledged financial protection mechanism should be developed and implemented to limit the OOP expenditure for low-income families. Families who save on OOP spending may have an opportunity to improve nutrition once they can redirect purchases due to improved coverage by aid programs. Providing households with assistance to cover healthcare expenses early could mean lower healthcare costs borne by the government in the future.

The household head's age is one of the main demographic characteristics. The age variable may represent age-related healthcare needs. The increased morbidity and mortality rates due to chronic diseases are mostly observed in the elderly population.[134] Moreover, large healthcare expenditures are attributed to declining health as people age, increased injury frequency in later stages of life, and chronic diseases associated with ageing.[64] Assuming that age may affect the use of healthcare services differently, its effect may not have a linear relationship with the likelihood of incurring health expenditures. The non-linearity could also result from the access and use of healthcare services related to socioeconomic conditions in later stages of life.[135] For example, the low-income elderly tend to be in poorer health but use less healthcare services than those with more income, irrespective of age.[136] Earlier studies reported that as the age of the household head increases to a certain level, the likelihood of making OOP expenditures decreases. Households headed by those 65 years old and older frequently make OOP expenditures. The ageing population is also the main driver of increasing healthcare expenditures. Elderly individuals are a vulnerable

TABLE 2 Maximum likelihood estimates and marginal effects (ME) of the multivariate probit model

Variables	MP		OTS		ITS	
	Estimates (se)	ME*100	Estimates (se)	ME*100	Estimates (se)	ME*100
Constant	**0.133 (0.121)**		**−0.845a (0.139)**		**−0.683a (0.136)**	
Discrete variables						
Demographic characteristics						
Gender	−0.303* (0.048)	−21.307*	0.000 (0.057)	−3.010	−0.171* (0.057)	−3.623*
Education Levels:						
Primary school	0.085*** (0.045)	6.071***	−0.014 (0.051)	0.233	0.050 (0.049)	1.248
Secondary school	0.123** (0.054)	9.283**	−0.002 (0.062)	1.496	0.077 (0.059)	1.871
High school	0.181* (0.054)	4.061*	0.020 (0.062)	−1.886	−0.010 (0.060)	−3.293
College	0.140** (0.062)	1.524**	0.081 (0.069)	0.843	−0.031 (0.070)	−4.307
Age categories:						
15–24 years	−0.279** (0.118)	−24.165**	−0.155 (0.140)	−12,761	−0.208 (0.140)	−4.228
25–34 years	−0.306* (0.059)	−11.384*	−0.148** (0.065)	−4.813**	−0.036 (0.065)	4.189
35–44 years	−0.325* (0.053)	−21.835*	−0.163* (0.058)	−10.626*	−0.163* (0.058)	−1.356*
45–54 years	−0.319* (0.048)	−29.508*	−0.203* (0.053)	−16.875*	−0.261* (0.054)	−5.683*
55–64 years	−0.265* (0.042)	−28.636*	−0.133* (0.046)	−14.537*	−0.271* (0.047)	−7.621*
Marital status:						
Never married	−0.332* (0.083)	−37.977*	−0.444* (0.104)	−32.808*	−0.353* (0.098)	−7.505*
Divorced/widowed	−0.057 (0.068)	−4.303	0.033 (0.081)	0.871	−0.037 (0.078)	−1.259
Occupation categories:						
Manager	−0.008 (0.064)	0.610	0.010 (0.070)	1.033	0.010 (0.070)	0.475
Professional occupational groups	0.140** (0.066)	2.883**	−0.021 (0.071)	−3.392	−0.009 (0.074)	−2.261
Technicians/assistant professional occupational groups	0.110 (0.069)	15.436	0.128*** (0.074)	11.500***	0.154** (0.073)	4.437b
Office service employee	−0.015 (0.071)	9.893	−0.073 (0.081)	2.205	0.135*** (0.079)	7.289c
Service/sales staff	0.040 (0.047)	2.693	−0.019 (0.054)	−0.590	0.022 (0.052)	0.616

(Continues)

TABLE 2 (Continued)

Variables	MP		OTS		ITS	
	Estimates (se)	ME*100	Estimates (se)	ME*100	Estimates (se)	ME*100
Constant	0.133 (0.121)		−0.845a (0.139)		−0.683a (0.136)	
Skilled agricultural/ forestry/aquaculture workers	−0.023 (0.052)	1.712	−0.014 (0.058)	0.866	0.030 (0.057)	1.901
Artists/professionals	0.143* (0.050)	8.801*	−0.049 (0.056)	−1.655	0.067 (0.055)	1.535
Facility managers-machine operators/ installers	−0.051 (0.053)	−1.731	−0.040 (0.060)	−1.448	−0.003 (0.059)	0.986
Occupations with no qualification requirement	0.077 (0.054)	11.600	−0.041 (0.063)	2.113	0.124b (0.060)	5.122b
Work preventing condition	0.177* (0.049)	23.337*	0.126** (0.055)	13.774**	0.233* (0.053)	7.192*
Socioeconomic characteristics						
Household disposable annual income levels:						
2st Level of income	0.124* (0.038)	13.565*	0.183* (0.045)	12.765*	0.123* (0.042)	2.215*
3st Level of income	0.104** (0.041)	12.017**	0.279* (0.048)	17.175*	0.106** (0.046)	0.762**
4st Level of income	0.175* (0.048)	13.739*	0.472* (0.055)	25.468*	0.095*** (0.053)	−2.652***
Household type:						
One-person household	−0.465* (0.078)	−49.818*	−0.229** (0.094)	−25.021**	−0.470* (0.089)	−13.149*
Nuclear family of spouses only	−0.154* (0.043)	−13.197*	−0.001 (0.047)	−2.890	−0.117** (0.047)	−3.257**
Nuclear family of single parent and children	−0.315* (0.077)	−31.036*	−0.195** (0.092)	−17.438**	−0.282* (0.086)	−6.812*
At least one nuclear family and other persons	0.167* (0.045)	19.596*	0.178* (0.049)	14.549*	0.186* (0.048)	4.621*
Consisting of more than one person without a nuclear family	−0.071 (0.112)	−19.251	−0.116 (0.139)	−14.084	−0.217 (0.139)	−8.053
Second-home ownership	0.029 (0.043)	2.501	0.154* (0.046)	8.009*	0.015 (0.048)	−1.207
Compulsory health insurance	0.126** (0.056)	19.524**	0.114*** (0.068)	12.536***	0.202* (0.064)	6.572*
Private health insurance	0.165* (0.040)	16.575*	0.211* (0.042)	14.585*	0.147* (0.042)	2.469*
Credit card	0.074* (0.029)	6.414*	0.057*** (0.032)	4.187***	0.055*** (0.031)	0.945***
Savings	−0.064** (0.029)	−4.987**	−0.131* (0.033)	−7.281*	−0.036 (0.032)	0.497
Household lifestyle choices						
Smoking	−0.055** (0.026)	−6.949**	−0.018 (0.029)	−3091	−0.069** (0.028)	−2.294**

TABLE 2 (Continued)

Variables	MP		OTS		ITS	
	Estimates (se)	ME*100	Estimates (se)	ME*100	Estimates (se)	ME*100
Constant	**0.133 (0.121)**		**−0.845a (0.139)**		**−0.683a (0.136)**	
Drinking alcohol	−0.085*** (0.051)	−7.452***	−0.082 (0.058)	−5633	−0.063 (0.058)	−0.945
Eating out	0.116* (0.028)	17.170*	0.031 (0.031)	7.541	0.179* (0.031)	6.428*
Cinema, theatre, sports games, etc.	−0.034 (0.042)	−9.065	0.079*** (0.045)	−0.105***	−0.108** (0.046)	−5.360**
Playing games of chance	0.192* (0.057)	10.727*	0.139** (0.061)	7.182**	0.066 (0.062)	−1.023
A coffeehouse, cafe, lounge, etc.	0.084* (0.029)	5.978*	0.078** (0.031)	4.679**	0.045 (0.031)	0.126
Shopping at the market	0.095* (0.026)	9.399*	0.093* (0.029)	6.921*	0.084* (0.028)	1.670*
Shopping online	0.138* (0.041)	7.916*	0.058 (0.045)	3.207	0.052 (0.045)	−0.122
Housing						
Residential status:						
Tenant	0.056*** (0.031)	0.115***	0.031 (0.035)	−0.003	−0.019 (0.035)	−1.986
Detached house	0.145 (0.096)	16.343	−0.028 (0.111)	3.399	0.162 (0.106)	5.786
Not a homeowner but not paying rent	0.086** (0.037)	5.176**	0.037 (0.041)	2.196	0.035 (0.040)	0.048
Housing type:						
Apartment	−0.073** (0.029)	−8.349**	0.005 (0.033)	−2.207	−0.082* (0.031)	−2.878*
Continuous variables						
Equivalent household size	−0.052*** (0.027)	−8.169***	−0.065** (0.030)	−6.114**	−0.084* (0.029)	−2.567*
Number of rooms in the house	0.005 (0.015)	1.997	−0.038** (0.017)	−0.924**	0.025 (0.017)	1.489
Correlation coefficients						
MP			0.410* (0.015)		0.622* (0.012)	
OTS					0.375* (0.016)	
Log-likelihood value	−19.171.613					

Note: Standard errors in parentheses.

*$p < 0.01$; **$p < 0.05$; ***$p < 0.10$.

community that significantly increases healthcare expenditures.[35,73] The current study results support previous findings that healthcare expenditures increase with advancing age, especially after the age of 65.[64,75]

Marital status also affected the probabilities of OOP spending. In this study, never-married household heads are less likely to report OOP expenditures on all healthcare service categories than those married. In general, married household heads are likely to have higher OOP expenditures due to healthcare needs for themselves, spouses, and children than household heads that are not married.[67] Also, insurance that provides access to healthcare is obligatory for those who do not have sufficient financial resources.[137] The OOP spending varied depending on whether the household had health insurance. As expected, households without health insurance have high OOP expenditures. However, there is some evidence that households that are covered by health insurance also have high OOP

expenditures.[24,42,63,138] The current study confirms that households with compulsory and private health insurance have higher OOP spending on all three categories of services as compared to households lacking insurance. However, as expected, the probability values in the case of private healthcare expenditures are higher when a household has mandatory health coverage. The likely reason behind this finding is that households with a large number of uninsured individuals tend to use fewer healthcare services due to financial constraints and thus are less likely to spend OOP on the three categories of services. Such families may be less likely to spend OOP on public and private healthcare providers that adopt integrated management and cost-sharing programs. In contrast, households with more insured individuals may be less price-conscious about health expenditures and seek healthcare services more often.[63]

The current study confirms the importance of occupation for the incidence of OOP expenditures. Households where the household head was a professional or an artist are more likely to spend on the MP category, while household heads with white-collar jobs and those with jobs for unskilled labourers are unlikely to spend on OTS. Studies showing that households headed by an employed worker had a higher likelihood of making OOP expenditures[42] but that unemployment is also an important determinant of OOP expenditures[41] is supported by the current study findings. On the other hand, households where the head was disabled are more likely to have OOP expenditures. The finding is consistent with previous reports.[37,88,139] Individuals with chronic diseases or conditions tend to need regular checkups and treatment more frequently than other household members.[87] Considering the probability of such families being poor and the incidence of some poorer households postponing treatment because they cannot afford OOP expenses, modifying the financial protection programs by providing the needed care and equitable distribution of healthcare services throughout the country would be more efficient in assuring good health of the population.

The relationship between healthcare expenditure and the occupation of the household head can be explained in part by the relationship between the occupation and income, and by the differences in basic health insurance systems for individuals with different occupations.[140] Occupation is regarded as the most important indicator of income level and education, besides being an effective indicator of behaviours, lifestyle, and living standards.[141] In society, members of professional occupations (doctor, academician, teacher, engineer, etc.) enjoy higher occupational prestige and status compared to the members of other occupational groups due to the required qualifications. Their occupation affects their lifestyles. Members of professional occupations often differ from others in how they spend their spare time (books, movies, music, etc.), vacationing habits, the way they use and evaluate mass media, shopping habits, as well as consumer preferences or probabilities.[142] In this respect, higher OOP expenditures may also reflect relatively higher income levels.

The effects of unemployment on individuals may also differ. The relationship between unemployment and basic health conditions differs between individuals and their unique situations. Their situations may result from educational differences, socioeconomic status, gender, age, availability of social and family support, and healthcare systems.[143] Economic inequality can present complex interactions between needs and OOP expenditures. Reducing inequality leads to better employment, higher income, better living conditions, and access to retirement plans.[43] In a study conducted in China, the employed were determined to be much less likely to utilise healthcare services or to pay out-of-pocket for such services compared to the unemployed. The finding was attributed to working people not only having better health status compared to the unemployed but also having access to better health insurance plans. In addition, government officials and administrators working for the state were found to be more likely to utilise healthcare services.[144] In another study, being a white-collar employee reduced OOP expenditures due to having access to free healthcare services in government facilities as well as maintaining a healthier lifestyle.[5] In Nigeria, on the other hand, an employed household head was found more likely to incur OOP expenditures, which was attributed to the fact that the share of unregistered employment in the total employment rate was high and that unregistered employees were not covered by social health insurance.[42]

Previous studies established that income is one of the main triggers of OOP expenditures. In the current study, compared to families with the lowest income (i,e., lowest quartile), all higher-income quartiles have higher probabilities of OOP expenditures on the MP and OTS categories. In particular, as household income increases, the probability of incurring MP expenditures increases by about 12% and 13% for the second and third quartile, respectively, and more than 13% for the highest income group (Table 2). The probabilities of having OTS expenditures are larger

and amount to 12.8% for the second quartile, 17.2% for the third quartile, and a whopping 25.5% for households with the highest incomes. The results suggest that the use of OTS is strongly influenced by household income and, presumably, implies better health conditions of household members in the higher income groups as compared to households with less income. It appears that OOP spending differences on ITS services are small since the calculated probabilities of having such expenditures for the second and third income quartile are small (Table 2), and even negative for the highest income group. The results likely reflect the existing government healthcare programs and possibly having private insurance in the case of households from the highest income quartile. Those findings echo previous results.[4,39,66] As incomes rise, the likelihood of spending on all categories increases, reflecting the tendency to use more healthcare services and/or more expensive or specialized treatment services.[57]

Poor families are at higher risk of exposure to poor health conditions, for reasons such as poor living standards, malnutrition, harsh working conditions, or problems in attaining preventive measures, and are therefore assumed to have more health-related demands.[41] In terms of income-related inequalities in healthcare expenditures, insurance, by implementing an interactive approach that combines an individual's income level and insurance status, has significantly reduced health expenditures among low-income earners compared to high-income earners.[145] In another study, health insurance was found to reduce out-of-pocket spending on healthcare and medicine at low-income levels, while higher-income among the insured increases out-of-pocket spending.[146]

Individuals with good health status incur healthcare expenditures less frequently than those with poor health.[145] Low-income people with poor health were found to spend as much as healthy individuals. Given the same health conditions, the low-income spend less on healthcare than the high-income due to limited financial resources. Those with income restrictions may forgo some consumption expenditures such as education, investment, or production for the sake of acquiring urgent health-related needs. On the other hand, the need for greater healthcare service utilization by high-income individuals is an important risk factor for higher out-of-pocket spending. This may be a consequence of higher-income individuals seeking higher quality medical care.[68,147]

The household type has a varying effect on the probability of OOP expenditures in any of the three categories of services (Table 2). The probability of OOP spending on the MP category decreases for households of singles by nearly 50% and by 31% for a single parent raising children. It also decreases in households of childless couples, but only by about 13.2% (Table 2). In the case of the OOP spending on OTS, the probability of such spending decreases only in the case of a single parent raising children by about 17.4%. It is possibly associated with the special government programs providing healthcare for children. Households of nuclear families with other persons (possibly multigenerational households), the probability of OOP expenditures on OTS increases by more than 14% (Table 2). This is also the only household type associated with an increased probability of having OOP expenses in the ITS category, although the increase is only about 8%. Households classified as other types, except for childless couples, have a lower probability of OOP spending on the ITS category of 13% or less. An increasing household size (Table 2) lowered the probability of OOP expenditures but by a decreasing amount across the three categories: by almost 8.2% in the case of MP, 6% on OTS, and under 3% in the case of ITS. Overall, results coincide with the findings of previous studies linking household size to OOP spending.[31,42,64]

Having private health insurance increases the probability of OOP spending on all categories (Table 2). The magnitude of the probability is largest in the case of MP services, almost 17%, about 15% in the case of OOP spending on OTS, and considerably smaller but still positive (less than 3%) in the case of ITS. Because private health insurance is voluntary it is believed to be more prevalent among households with high incomes. The demand for private insurance is affected by various economic, social, and demographic factors.[148] Additionally, high GDP per capita, health expenditures, and level of education are the strongest determinants for the use of private insurance.[149]

Having a credit card increases the probability of OOP spending as compared to households not using that method of payment, but the increases range from small to marginal (Table 2). The probabilities associated with the MP and OTS categories have more pronounced effects because payments for those services are, as expected, easier with a credit card. To deal with the cost of illness, households either use their savings and income or rely on constrained means of financing such as the depletion of household assets, loans, and family and friend support.[128] The main

reason for making fewer health service purchases is a lack of money or savings.[127] However, one of the interesting results of the current study is that households with savings have a lower probability of OOP spending on the MP (nearly 5%) and OTS (almost 7.3%) categories than those without savings.

Variables associated with lifestyle choices have a mixed effect on OOP expenditures on the three categories of services. The probability of having OOP expenditures are smaller in households using tobacco (about 7%) and alcohol (about 7.5%) on MP services and ITS in the case of tobacco use (less than 3%). The latter result could be associated with the government healthcare program covering ITS when some tobacco users may require hospital stays. Families that report eating out had a markedly higher probability of having OOP expenditures on the MP category (more than 17%) and ITS (nearly 6.5%). Households frequenting cinemas or sports events had a slightly smaller probability, about 5.4%, of OOP expenditures on ITS (Table 2), while playing games of chance increased the probability of OOP expenditures on the MP category by nearly 11%. If visiting coffee houses, cafes, or lounges was a part of a household lifestyle, the probability of OOP expenditures on the MP and OTS categories increased by about 6% and 5%, respectively. Shopping at open-air markets or online tends to increase OOP expenditure probability on all three health service categories, except for the spending on the ITS and OTS category in the case of online purchases (Table 2). It appears that lifestyle choices matter in the incidence of OOP payments, but the effects measured as probability changes on any of the three categories varied in their direction and magnitude. It is likely that dynamically changing lifestyles could lead to more changes in OOP expenditure and may have to be tracked more accurately.

6 | CONCLUSION

The accessibility of healthcare services, expanding their use, and reducing the potentially catastrophic effect of healthcare expenses on households are of paramount importance to governments. In Turkey, those overarching measures, including the fair and efficient distribution of healthcare services, is a major focus of government programs, especially the reduction of risk of impoverishing a household as a result of OOP expenditures.

This investigation of factors influencing the probability of OOP expenditures on three categories of healthcare services involves a nationwide sample of households from the HBS in Turkey. The approach recognises the possible relationships across the three categories of services, that is, MP, OTS, and ITS, and applies the multivariate probit (MP) model. The suitability of the multivariate probit model is confirmed by statistical testing. The calculated correlation coefficients in the MP model are positive and statistically significant suggesting an increase (decrease) in the probability of OOP spending in one category when the value of any unobservable variable increases (decreases) the probability of OOP expenditure on another healthcare service category.

Results show that particularly large changes in the probability of OOP spending are associated with the demographic attributes of the respondent. Respondents with higher than the lowest education level spend more on the MP category, whereas young respondents are unlikely to spend on ITS, and respondents 65 years of age or older spend more than respondents from all other age categories. Those with more education spend more on MP and likely experience better health outcomes than the poorly educated. The oldest respondents have a higher probability of OOP spending on all three categories as could be expected. In the short run, that group requires assurance of getting proper care, while in the long run, the policies may stress the need for preventive care, which can reduce OOP expenditures forthe elderly. Married individuals had a lower probability of spending, while occupation lacked a consistent and clear effect on OOP expenditures in the considered categories. Overall, the probability of OOP spending on all services increased as income increased. In a growing economy like that of Turkey, it can be expected that those expenditures will continue to increase in the foreseeable future. The key issue for policymakers will remain the share of such expenditures in total household expenditures and if the share's growth is less than the growth of all expenditures, there will likely be less social pressure to address OOP spending. Multigenerational families have a higher probability of spending on each considered category. Such households are likely to have two types of

vulnerable individuals, namely children and the elderly, causing the probability to increase as compared to a couple with children only (a two-generational family).

Families assuming responsibility for their healthcare as reflected in having private health insurance, as well as compulsory insurance, increased the probability of OOP spending, but families trying to save money had a distinct, but small probability of decreased spending on MP and OTS healthcare categories. Whereas saving is a desirable habit, smoking or drinking, which have a similar negative effect on MP spending, are not. Continuing education of the public about the detrimental effects of certain habits may improve health and also decrease the probability of OOP expenditures.

This study was unique in that it considered lifestyle factors, other than smoking and drinking, and showed their positive effect on the probability of increasing OOP spending but mostly on MP. Lifestyles are shaped by numerous factors and since education and income were explicitly considered in the model, the effects were attributed to culture and personal preferences. The MP category was broad and the higher probability of spending associated with lifestyles could reflect advertising and promotion targeting shoppers. The role of the government in decreasing such expenditures is rather minimal.

Government policy needs to place a higher priority on assisting low-income, large households residing in apartments. The likelihood of OOP expenditures by households in the lowest income quartile is low but still present. At-risk, low-income households require policymakers to consider suitable mechanisms for assuring healthcare service accessibility. The possibility of healthcare expenditures having a catastrophic effect on a household varies and fear of such costs may affect behaviour in seeking needed healthcare services.

Households headed by a retiree, student, housewife, or person who is not a working have a lower probability of being faced with OOP expenditures, possibly indicating that the lack of income may delay seeking medical care. Improving healthcare access for the unemployed will also reduce unregistered unemployment. Households indicating a member with a condition preventing work are more likely to incur OOP expenditures. It appears that policies addressing specific needs of citizens with work-preventing conditions by improving their access to healthcare services will reduce household OOP expenditures. The disabled may have special needs including equipment, non-prescription medication, and physical therapy, and having access to those services will improve their quality of life and help integrate them into society at large.

Finally, large households seem to have a lower probability of OOP spending on any of the three categories of healthcare services. It is not clear whether the lower probability is linked to the demographic composition of the household. For example, households with many young children may benefit from special government programs already addressing their needs. A future study may explore that issue together with the presence of the elderly in a household.

There are several limitations inherent in this study. The data in the study were secondary. The variables essential for performing statistical analyses consisted of the variables in the data set. In the HBS, the head of the household was not asked questions about the number of sick individuals in the household or about their illnesses. Similarly, there is limited information on healthcare expenditures. Information on pregnancy and maternity expenditures is lacking. Only the expenses related to pregnancy tests were included. The multivariate Heckman Sample Selection model, which considers spending levels along with spending probabilities, can provide more information to policymakers and third-party stakeholders. However, since such a model contains multi-dimensional integrals, it is highly likely that the parameters may not converge at the peak of the model's maximum likelihood function. A future study could eliminate some of the limitations if suitable data become available.

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CONFLICTS OF INTEREST

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

ETHICS STATEMENT

Not applicable.

DATA AVAILABILITY STATEMENT

The data underlying this study is subject to third-party restrictions by the Turkey Statistical Institute. Data are available from the Turkish Statistical Institute (bilgi@tuik.gov.tr) for researchers who meet the criteria for access to confidential data. The authors of the study did not receive any special privileges in accessing the data.

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