

PAPER DETAILS

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AUTHORS: Melek TERZI,Mehmet Nurullah KURUTKAN,Dilek SAHIN,Oguz KARA

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Unmet medical care needs due to payment difficulty

Ödeme güçlüğüne bağlı karşılanamayan tıbbi bakım ihtiyacı

Melek Terzi¹, Mehmet Nurullah Kurutkan², Dilek Şahin³, Oğuz Kara⁴

¹ Res. Asst. Duzce University, melekterzi@duzce.edu.tr, Orcid: 0000-0001-8586-7874

² Assoc. Prof. Duzce University, nurullahkurutkan@duzce.edu.tr, Orcid: 0000-0002-3740-4231

³ Asst. Prof. Duzce University, dileksahin@duzce.edu.tr, Orcid: 0000-0003-0865-7763

⁴ Assoc. Prof. Duzce University, oguzkara@duzce.edu.tr, Orcid: 0000-0002-8934-5608

ABSTRACT

Objective: This research aims to generate new evidence about the unmet need and its causes as well as identifying various predictors and causes of unmet health needs (UHN) in the Turkish health system. **Methods:** The variables used in the analysis were obtained from the "2016 TURKSTAT Health Survey" micro data set. Two models were established to determine the degree of socio-economic variables affecting the payment difficulty in medical care. Binary logit regression analysis was used to analyze the models. **Findings:** The variables of gender, marital status, and continuity of employment do not affect payment difficulty due to treatment ($p > 0.05$). An increase in age by one unit reduces the risk of treatment-related payment difficulty by 0.966 times. ($p < 0.05$). Social security, being in the first three levels of education, income status, having a disease in the last six months, and having a chronic disease significantly predict unmet health services due to payment difficulty. ($p < 0.05$). **Conclusions:** Turkish healthcare system still has an unmet need for treatments. Better financial and institutional policies can address the vast majority of unmet health needs. Particular attention needs to be paid to unmet needs among people in poor health.

ÖZ

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INTRODUCTION

According to the World Health Organization, health services should be "reliable, effective, timely, efficient, fair and human-centered" (1). However, in many parts of the world, people do not have adequate access to the health services they need due to inequality, expensive health services, geographical barriers/transportation, insufficient number of physicians, and waiting times (2). A report published in 2019 stated that at least half of the world's population cannot access basic health services, at all, while about 800 million people spend at least 10% of their household income on health care

costs for themselves or a sick child. It is stated that 100 million people have to live with only \$ 1.90 per day (3). The statement made by the World Bank president regarding the 2019 report, "Health, a basic human right, has become a luxury that only the wealthy can afford" supports the mentioned above (4). In light of this background, the issue of unmet health services in societies gains importance and the underlying factors of unmet health need (UHN) services emerge as an area to be examined.

As one of the most fundamental dimensions of social justice, access to health services is generally accepted

as an indicator of equality or inequality in any health system. (43). Access to health services and removing barriers to access is one of the issues that the health policy discipline focuses on the most. However, access is a complex and multidimensional concept that cannot be measured directly (44). In the literature, one of the most important and legitimate indicators of access to health services is unmet health care (45). The UHN is one of the vital health quality indicators that makes measurable the barriers people face when seeking medical care that can reflect the financial, physical, and cultural accessibility of health services. UHN could be defined as ‘the differences between services judged necessary to deal appropriately with health problems and services received. (46). The unmet need can be defined as ‘differences between necessary services to deal with health problems appropriately and services received’ (5). Therefore, if individuals do not receive the necessary treatment, which is believed to improve their health, the need is considered unmet (43).

UHN is usually measured in two main ways. The clinical indicators determined by the health professionals and the measurement based on the people’s subjective experiences constitute of those two main approaches (5). In the clinical approach, which is based on clinical guidelines, the judgment of health professionals is used to determine whether a person is receiving appropriate care (45, 46). In this approach, a sample is usually taken from the community (47). The survey method is applied to individuals based on whether they have experienced this situation.

“Unmet health services” is defined as the differences between the services related to the health problems that are thought to be necessary to be dealt with and the services received. In other words, it is an unmet need, lack of adequate/proper care and service (5). However, the inability of various groups in the population to have “equal access” to the medical care system is also considered an unmet health need (6).

There are many studies in the literature to identify health needs that are not met. When the studies were categorized according to age groups, studies on unmet health services of infants (7,8), children (9–11) and the elderly (12–14) stand out. When categorized according to community classes, among insured and uninsured people (15), studies to identify unmet health care for cancer patients (16,17) people with HIV infection (18–20), and homeless people (21–23) are prominent. 2,24,25,27–29 etc. studies are at the forefront of the country-based study.

It is not possible to define exactly an unmet health need (25) and the underlying factors. In all these studies to

date, numerous factors affecting unmet health services have been addressed. In addition to demographic features such as age, gender, marital status, educational status, insurance type, and coverage, different variables such as monthly income (29,30), family type (29), chronic diseases (31,32), job loss status (29), homeownership status (30), total time of homeless (30,31), waiting time while receiving service were also addressed.

We used Andersen’s Behavioral Model of Healthcare Utilization to explore potential determinants of UHN. According to the developed behavioral model, health care use is a function of predisposing factors, enabling factors, and health care needs (48, 43). According to the model, demographic characteristics such as age, gender, marital status and family size, and social structure such as employment, education, and ethnicity are predisposing factors. In addition, financial resources such as income, health insurance, and geographical distance from health services were also evaluated as enabling factors. Disease severity, self-assessed health status, and multiple chronic conditions are also considered need factors in this model. (49). This research aims to generate new evidence about the level of unmet need and its causes, and also identify various predictors and causes of UHN in the Turkish health system.

DATA SET AND METHOD

In this study, “2016 Turkey’s Health Research” micro data sets were used. The Health Questionnaire is conducted every 2 years by TURKSTAT and the most recent survey belongs in 2016. Its scope is households located in all settlements within the borders of Turkey. The total number of observations in the data set is 23.606 but groups between the ages of 0-6 and 7-14 in the data set were not included in the study. The total number of observations decreased to 17,242 as information about individuals older than 15 years was used in the study. Later, when the variables not required for research and lost data in the observations were removed from the data set, the number of observations decreased to 2676¹.

Turkey Health Survey roughly measures unmet health care services using two approaches. The first distinction is inaccessibility due to delay, and it is grouped under two headings: appointment-related delays and transportation-related delays. The second distinction is inaccessibility due to the inability to pay. This distinction is divided into four parts: medical care, dental care, medicine, and mental health inaccessibility due to the inability to pay, constitute four headings. The dependent variable of this study is the inability to access medical services due to payment difficulty.

The binary logit regression analysis method was used

All variables, variable definitions and data sources used in the analysis are shown in Appendix 1.

to determine the factors affecting payment difficulty in medical care. The Binary Logit regression method was used as an alternative to linear regression analysis due to the violation of the normality assumption if the dependent variable is binary such as 0 and 1. The main purpose is to determine the probability of the dependent variable with the x explanatory variables.

$$Y = \begin{cases} 1 & \text{if the result is successful} \\ 0 & \text{if the result fails} \end{cases}$$

The probability of realization is expressed by $P(Y = 1) = \pi$ and probability of non-realization ($Y = 0$) = $1 - \pi$. For the linear probability model defined as $P_i = \beta_0 + \beta_1 \chi_i$, the logistic cumulative distribution function can be written as below to indicate the probability of P_i 'th decision unit to make a certain choice (33).

$$P(Y \leq y) = F(y) = \frac{1}{1 + \exp(-\mu y)} \quad -\infty \leq y \leq \infty$$

μ specifies the positive scale parameter. When all other variables are fixed, $\exp(\mu y)$; refers to the different rate or factor change. When is expressed as a choice probability;

$$P_i = F(V_{ia} - V_{ib}) = \frac{1}{1 + \exp(-\mu(V_{ia} - V_{ib}))}$$

Assuming that $\mu = 1$, instead of V_{ia} and V_{ib} , $\beta'X_{ia}$ and $\beta'X_{ib}$ can be used. For this nonlinear relationship to be predictable, it is possible to convert it into a linear form by performing some necessary mathematical operations. The following equation is obtained by considering that the probability of realization of the decision unit is P_i and the probability of not realizing is $1 - P_i$ (34).

$$P_i = \frac{1}{1 + \exp(-\beta'(X_{ia} - X_{ib}))}$$

If $X_{ik} = X_{ia} - X_{ib}$ is defined, the binary logit model can be expressed as follows

The X_{ik} in the equation appears as the ratio of the probability of realization of the decision unit to the probability of not realizing it. This ratio is called the "Odds Ratio". L_i is specified as the natural logarithm of the odds ratio as follows

$$L_i = \prod_{k=1}^{j-1} \frac{1}{1 + \exp(-\beta'X_{ik})}$$

where X_{ik} is the vector of differences on each of the p attributes describing the k th pair of alternatives, which is defined for each individual i. The maximum likelihood estimates are found by optimizing L_i (35).

FINDINGS

The average age of the people in the study is 55,62 (SD $\pm 17,807$). Most of the participants are primary school graduates (44%), women (58.2%), married (74%), whose household income is less than 1264 TL (30.3%) and less than 26 % are people who report their overall health status as "good and very good".

In the study, "cohen d" statistics for binary groups and " η^2 -eta square" statistics for multiple groups were calculated to calculate the magnitude of the effects of variables on the dependent variable. According to the results of the difference analysis, the variables where there is a significant difference between the groups are as follows: There are statistically significant differences between the sub-categories of the variables such as age, education status, marriage, household income, having social security, full-time job and being sick in the last six months. Divorced people, primary school graduates, people with the lowest household income, people without social security, and those who work in temporary employment are the most victims of unmet healthcare services due to payment difficulty.

We performed the regression analysis at two levels. At level one, we measured binary logit regression analysis with ten variables. Accordingly, the variables of gender, marital status, and continuity of employment do not affect payment difficulty due to treatment ($p > 0.05$). An increase in age by one unit reduces the risk of treatment-related payment difficulty by 0.966 times ($p < 0.05$). Social security, being in the first three levels of education, income status, having a disease in the last six months, and having a chronic disease significantly predict unmet health services due to payment difficulty ($p < 0.05$). The coefficients of those with more than one chronic disease and those who receive outpatient services more than once are negative. The table below (Table 3) shows a model with only statistically significant variables with the forward method. The comments are the same as the sentences above.

It is inferred from the Hosmer-Lemeshow test statistic (since the Hosmer-Lemeshow probe value is greater than 0.05) that the data used in Table 2 and Table 3 is by the established model. The Cox & Snell R Square value is 0.095 and the Nagelkerke R Square value is 0.172.

DISCUSSION

In this study, using the data obtained from TURKSTAT, the factors affecting the payment difficulty in medical care among the participants of the 2016 health survey and the magnitude of these factors were examined. Results show that 13.6% of respondents in Turkey have to pay for difficulty in medical care. Studies conducted

Table 1: Difference Analysis of Variables

		N	%	Mean	Std.	IC	p-value	EB (cohen d and η^2 -eta square)
Gender	Female	1557	58,2	0,15	0,009	0,13	0,16	0,120
	Male	1119	48,8	0,12	0,010	0,10	0,14	
Age	15-96 age	2676	.	55,62	17,807	.	.	0,000
Education level	Didn't finish any school	230	8,6	0,20	0,026	0,14	0,25	0,000 0,00992
	Illiterate	433	16,2	0,14	0,017	0,11	0,17	
	Primary school	1177	44,0	0,15	0,010	0,13	0,17	
	Secondary school	184	6,9	0,11	0,023	0,06	0,15	
	High school	365	13,6	0,12	0,017	0,08	0,15	
	College	118	4,4	0,07	0,023	0,02	0,11	
	Univesity and post graduate	169	6,3	0,05	0,017	0,02	0,09	
Marital status	Single	195	7,3	0,17	0,027	0,12	0,22	0,005
	Married	1980	74	0,13	0,008	0,12	0,15	
	Divorced	119	4,4	0,23	0,039	0,15	0,3	
	Spouse died	382	14,3	0,11	0,016	0,08	0,14	
Household income	0 - 1264 tl	811	30,3	0,22	0,014	0,19	0,25	0,000 0,03149
	1265- 1814 tl	765	28,6	0,13	0,012	0,11	0,15	
	1815- 2540 tl	450	16,8	0,11	0,015	0,08	0,14	
	2541 - 3721 tl	369	13,8	0,08	0,014	0,05	0,11	
	3722 + tl	281	10,5	0,03	0,01	0,01	0,05	
Social security institution (SGK) treatment cost *	No	440	16,4	0,29	0,022	0,25	0,34	0,000 1,116313
	Yes	2236	83,6	0,11	0,006	0,09	0,12	
Work continuity	Permanent employee	542	20,3	0,2	0,017	0,17	0,23	0,000 0,769231
	Other	2134	79,7	0,12	0,007	0,11	0,13	
Disease status over 6 months	Yes	656	24,5	0,09	0,011	0,06	0,11	0,000 0,62385
	No	2020	75,5	0,15	0,008	0,14	0,17	

* Payment of treatment cost by the Social security institution (SGK)

Table 2. Findings of Binary Regression Econometric Model 1

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender	-0.011	0.137	0.006	1	0.938	0.989	0.756	1.295
Age	-0.034	0.005	51.831	1	0.000	0.966	0.958	0.975
Social Security (SGK)	-0.77	0.149	26.738	1	0.000	0.463	0.346	0.62
Education			10.653	3	0.014			
Education (1)	1.239	0.413	9.01	1	0.003	3.453	1.537	7.755
Education (2)	0.788	0.372	4.478	1	0.034	2.199	1.06	4.563
Education (3)	0.64	0.388	2.719	1	0.099	1.897	0.886	4.06
Marital status			3.853	3	0.278			
Marital status (1)	-0.215	0.339	0.403	1	0.525	0.806	0.415	1.567
Marital status (2)	0.118	0.212	0.311	1	0.577	1.126	0.743	1.706
Marital status (3)	0.372	0.308	1.459	1	0.227	1.451	0.793	2.653
Work Continuity	-0.04	0.144	0.076	1	0.782	0.961	0.725	1.273
Income			37.471	4	0.000			
Income (1)	1.943	0.388	25.114	1	0.000	6.979	3.264	14.921
Income (2)	1.427	0.385	13.702	1	0.000	4.165	1.957	8.866
Income (3)	1.308	0.396	10.897	1	0.001	3.699	1.701	8.043
Income (4)	1.025	0.412	6.176	1	0.013	2.786	1.242	6.25
Disease status over 6 months	0.683	0.2	11.622	1	0.001	1.979	1.337	2.93
Those with more than one chronic disease	-0.66	0.198	11.079	1	0.001	0.517	0.351	0.762
Receiving more than one service from the outpatient services	-0.333	0.127	6.912	1	0.009	0.717	0.56	0.919
Constant	-2.025	0.618	10.731	1	0.001	0.132		

Table 3. Findings of Binary Regression Econometric Model 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for XP(B)	
							Lower	Upper
Age	-0.033	0.004	74.988	1	0.000	0.967	0.96	0.974
Social Security (SGK)	-0.781	0.145	28.937	1	0.000	0.458	0.345	0.609
Education			11.457	3	0.009			
Education (1)	1.28	0.411	9.704	1	0.002	3.596	1.607	8.045
Education (2)	0.831	0.371	5.022	1	0.025	2.295	1.11	4.747
Education (3)	0.658	0.388	2.868	1	0.090	1.93	0.902	4.133
Income			38.288	4	0.000			
Income (1)	1.928	0.385	25.043	1	0.000	6.877	3.232	14.635
Income (2)	1.421	0.385	13.613	1	0.000	4.142	1.947	8.812
Income (3)	1.316	0.396	11.031	1	0.001	3.73	1.715	8.11
Income (4)	1.023	0.412	6.16	1	0.013	2.783	1.24	6.245
Disease status over 6 months	0.709	0.2	12.617	1	0.000	2.033	1.374	3.007
Those with more than one chronic disease	-0.645	0.197	10.779	1	0.001	0.525	0.357	0.771
Receiving more than one service from the outpatient services	-0.338	0.126	7.165	1	0.007	0.713	0.557	0.913
Constant	-2.051	0.527	15.147	1	0.000	0.129		

in other countries on a similar subject were examined and in these studies, the rates such as 12% in Italy (36), 16.6% in Hungary (27), and 11.6% in Korea (37) are noteworthy.

In other studies related to health services not met in medical care, gender variable, which is one of the demographic features, was found to be a significant factor (38), but in this study, it was found that it wasn't a significant factor. Similar results were obtained for variables such as age (21,26,27,36), marital status (37,40), educational status (26,39,41) and household income (28,42). In similar studies in the literature (37), chronic diseases have a significant effect on unmet health care.

Education and household income were other important factors that changed the unmet need in both regression models. Less-educated individuals suffer from unmet needs caused by the health system's performance. Less educated people suffer from financial difficulties that make them vulnerable to unmet needs due to the performance of the healthcare system. However, numerous previous studies (45, 43) confirmed the positive association between low education and general and systemic unmet need. In this study, gender and marital status did not significantly correlate with unmet needs and their different causes. In a recent survey in Iran, no significant relationship was found between these factors and outpatient healthcare use (50).

A further level of research is needed to examine the reasons for the access to health care services related to payment difficulty of people with a large number of chronic diseases, those who receive more than one outpatient services, and those exposed to the disease in the last six months. It is not expected that the beta coefficients of all three variables are negative. Researchers need to make detailed studies to analyze this unexpected situation.

LIMITATIONS

Data from the Turkish Health Survey (2016) used in the analysis do not include data on cancer disease, whether patients are using drugs regularly, the stage and level of severity of the disease, and whether patients are applying for traditional complementary medicine. These variables are thought to affect the payment difficulties in medical care. Moreover, the results of this study are difficult to generalize, as they are influenced by the country's cultural background and reimbursement system. Therefore, it is more appropriate to interpret the results of the analysis in light of the country's health system. Among the factors that may affect unmet medical needs, variables such as distance to the medical facility in km, possession of a private car, and moral hazard

due to insurance technique and adverse selection could be included in the study. These were not included in the analysis because questions about these were not asked in the data set. The data from the Turkish Health Survey are based on the patient's statements rather than medical records. The accuracy of survey data may be impaired by any of a number of sources of bias, such as the tendency to recall. Finally, since this study uses only a cross-sectional research design based on one-year (2016) data, it would be beneficial to conduct a deeper analysis of causal relationships in future studies. In the future, it will be useful to investigate trends in change with a time series analysis using accumulated longitudinal data.

CONCLUSION

Researching unmet health needs can help policymakers assess access to health care. This study shows that socio-demographic groups still suffer from an unmet need in Turkey's health sector. People who do not have social security should be gathered under the umbrella of social security. The government should implement social policy tools for the lowest income groups. The risk of being affected by the lower-income groups is approximately six times higher than the highest income group, and those with low education levels are at risk. A further level of research is needed to examine the reasons for the access to health care services related to insolvency of people with a large number of chronic diseases, those who receive more than one outpatient services, and those exposed to the disease in the last six months.

According to the results of this study, it was revealed that approximately 14 out of every 100 people in Turkey need unmet medical care. In this study, there was no analysis for the variables of not having the financial power to spend on medication, difficulty in paying for dental care, access problems arising from the transportation, and not being able to get an appointment. Further studies are needed for the analysis of these variables. As a result, socially and economically vulnerable people experience unmet medical needs more than others. Therefore, economic and public health approaches will be mandatory to reduce the experiences of people with unmet medical needs. In this case, policymakers can benefit from evidence-based econometric models of the comparative burden of different chronic situations and demographic indicators.

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ANNEX 1: Variable Descriptions

Variable	Variable Description		Data Source
Gender	1: Male	0: Female	TSI, 2016 Turkey Health Interview Survey Micro Data Set
Calculated age	15-96 age		
Education level	0: Didn't Finish any school 1: Illiterate 2: Primary School 3: Secondary School	4: High School 5: College 6: University and Postgraduate	
Marital status	1: Single 2: Married	3: Divorced 4: Spouse died	
Household income	1: 0 - 1264 ₺ 2: 1265- 1814 ₺ 3: 1815- 2540 ₺	4: 2541 - 3721 ₺ 5: 3722 + ₺	
Treatment cost covered by SGK (Social Security Institution)	0: Yes	1: No	
Work continuity	1: Permanent employee	0: Other	
Disease status over 6 months	1: Yes	0: No	
Those with more than one chronic disease	1: Yes	0: No	
Receiving more than one service from the outpatient services	1: No	0: Yes	
Payment difficulty in medical care	1: Yes	0: No	

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