Unmet Medical Care Needs Due To Payment Difficulty

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Abstract

Objective: This study aims to determine the effects of chronic diseases and socio-economic factors on payment difficulty in medical care.

Methods: The variables used in the analysis were obtained from the “2016 TURKSTAT Health Survey” micro data set. Three models were established to determine the degree of chronic disease data and socio-economic variables affecting the payment difficulty in medical care. Binary Logit Regression analysis was used to analyze the models.

Findings: In terms of payment difficulty in medical care; age, education, household income, social security institution (SGK) treatment cost, general health insurance (GSS) treatment cost, other treatment cost, reason for not working, work continuity, working method, overall health status, being sick longer than 6 months, vital activity restriction, asthma, bronchitis, coronary heart failure, arthrosis, waist and neck disorders, allergy, liver failure, kidney disease, depression, other chronic diseases, wearing glasses, physical pain state, pain preventing life, feeling worthless, receiving bed service for the last 12 months, receiving daily service for the last 12 months, drug use by his own decision, cholesterol measurement status, blood glucose measurement status, stool occult blood test measurement status, being late for appointment, payment difficulty in dental care, in drug and in spiritual treatment, tobacco use status and exposure to tobacco smoke were effective ($p<0,05$). According to Cohen d, the groups with the strongest effect on payment difficulty in medical care are payment difficulty in dental care, drug and spiritual treatment, delay due to transportation, depression and chronic bronchitis (E.B. > 0,8).

Conclusions: According to the results of the research, it was determined that chronic diseases and socio-economic variables are effective in the payment difficulty of medical care. Policymakers can benefit from evidence-based on econometric models of the comparative burden of different chronic conditions, demographic and economic structure.

1. 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, waiting times [2]. A report published in 2019 stated that at least half of the world's population can not 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 of societies gains importance and the underlying factors of unmet health services emerge as an area to be examined.

“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 actually 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 as unmet health needs [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], homeless people [21–23] are prominent. [2, 24–28] etc. studies are at the forefront on 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.

2. 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 to 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 2676.

As a result of preliminary analysis studies to determine the suitability of the data obtained from the research to factor analysis; The KMO (Kaiser-Meyer-Olkin) value was 0.778 and the result of the Barlett-Sphericity Test was 0,000 and the chi-square value was 32200,365. These results show that the data are suitable for exploratory factor analysis.

As a result of the analysis carried out to determine the factors, cyclical items and the variables with a coefficient less than 0.45 were excluded from the analysis and the process was repeated several times. Accordingly, the variables extracted from the analysis are gender, treatment costs covered by private health insurance and other options, the reason for not working, some chronic diseases (hypertension-arthrosis-diabetes-liver failure-urinary incontinence-kidney disease-celiac), wearing glasses, going to a psychotherapist for the past 12 months, outreach service, self-drug use and payment difficulty in spiritual treatment. As a result of factor analysis at the last stage, there are 18 factors whose initial self-value is more than 1 considering total values. These 18 factors account for 58,926% of the total variance.

Three different models (simple, moderate and comprehensive level) were established to determine factors affecting the payment difficulties in medical care. In all three models, the dependent variable is the payment difficulty in medical care in the last 12 months. Independent variables are gender, calculated age, education, marital status, household income, overall health status, chronic diseases, payment status of treatment cost by the social security institution (SGK) and general health insurance (GSS), physical pain status, disease status over 6 months and restriction of vital activities related to health problems in the first model. In the second model, status at work, working method and work continuity were added to the independent variables in the simple model. In the third level model place of birth, citizenship, defect of vision, wearing a hearing aid, hearing loss, distress, feeling worthless, receiving bed service for the last 12 months, receiving daily service for the last 12 months, getting physiotherapist service for the last 12 months, getting service from the physical therapist for the last 12 months, getting psychologist service for the last 12 months, getting psychotherapist service for the last 12 months, getting service from the dentist, getting service from family physician, getting service from a specialist physician, prescribed drug use status, blood pressure measurement status, cholesterol measurement status, stool occult blood test status, colonoscopy status, delay due to long appointment time, delay due to transportation, payment difficulty in dental care, payment difficulty in drug, tobacco use status, exposure to tobacco smoke and alcohol use status were added to the variables in the previous model.

Binary Logit regression analysis method was used 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.

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

The probability of realization is expressed by P (Y = 1) = π and probability of non-realization (Y = 0) = 1-π. For the linear probability model defined as $P_i = \beta_0 + \beta_1 X_i$, 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].

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

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

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

Assuming that μ = 1, instead of $V_{ia} and V_{ib}$, $\beta' X_{ia} and \beta' X_{ib}$ can be used. In order 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].

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

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

$$P_i = \frac{1}{1 + exp\left(-\beta' X_{ik}\right)}$$

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

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

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

3. Findings

The average age of the people in the study is 55,62 (SD ± 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 terms of payment difficulties in medical care, age, education, household income, payment of treatment cost by the social security institution (SGK) and general health insurance (GSS), reason for not working, work continuity, working method, overall health status, disease status over 6 months and restriction of vital activities related to health problems were effective. In addition, asthma, bronchitis, coronary heart failure, arthrosis, lumbar and neck region problems, allergies, liver failure, kidney disease, depression, other chronic diseases, wearing glasses, physical pain status, pain preventing life, depression, feeling

worthless, receiving bed service for the last 12 months, receiving daily service for the last 12 months, self-medication use, cholesterol measurement, blood glucose measurement, stool occult blood test measurement, delay appointment, payment difficulty in dental care, payment difficulty in drug, payment difficulty in spiritual treatment, tobacco use status and exposure to tobacco smoke were effective ($p < 0,05$) (Table 1). On the other hand, age, marital status, place of birth, citizenship, having private health insurance, status at work, infarction, hypertension, stroke-paralysis, diabetes, urinary incontinence, Alzheimer's, defect of vision, wearing a hearing aid, hearing loss, getting service from the dentist, getting service from family physician, getting service from a specialist physician, physiotherapist, physical therapy specialist, psychologist, psychotherapist and psychiatrist for the last 12 months, getting outreach services, prescribed drug use status, blood pressure measurement, colonoscopy and alcohol use status variables are variables that do not have a significant effect on medical payment difficulties ($p > 0,05$).

Table 1
Difference Analysis of Variables

		N	%	Mean	Std.	IC		p value	EB (cohen d and η²-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		
Place of birth	Turkey	2602	97,2	0,14	0,007	0,13	0,15	0,080	
	Other countries	74	2,8	0,07	0,029	0,01	0,13		
Citizenship	Turkey	2641	98,7	0,14	0,007	0,12	0,15	0,379	
	Other countries	35	1,3	0,09	0,048	-0,01	0,18		
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		
Private health insurance (ÖSS) treatment cost **	No	2643	98,8	0,14	0,007	0,12	0,15	0,074	
	Yes	33	1,2	0,03	0,03	-0,03	0,09		
General health insurance (GSS) treatment cost ***	No	311	11,6	0,28	0,025	0,23	0,33	**0,000**	**0,871576**
	Yes	2365	88,4	0,12	0,007	0,1	0,13		
Self-treatment cost	No	2289	85,5	0,12	0,007	0,1	0,13	**0,000**	**0,796333**
	Yes	387	14,5	0,25	0,022	0,21	0,3		
Reason for not working	Inability to find work / unemployment	2406	89,9	0,13	0,007	0,12	0,14	**0,001**	**0,599208**
	Other reasons	270	10,1	0,2	0,025	0,16	0,25		
Status at work	Salary employee	784	29,3	0,13	0,012	0,1	0,15	0,391	
	Other	1892	70,7	0,14	0,008	0,12	0,16		
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		
Working method	Full time	220	8,2	0,18	0,026	0,13	0,23	**0,041**	**0,262613**

(* Payment of treatment cost by the Social security institution (SGK), ** Payment of treatment cost Private health insurance (ÖSS), *** Payment of treatment cost General health insurance (GSS))

		N	%	Mean	Std.	IC		p value	EB (cohen d and η²-eta square)
	Part time	2456	91,8	0,13	0,007	0,12	0,15		
Overall health status	Very good	75	2,8	0,28	0,052	0,18	0,38	**0,000**	**0,0153**
	Good	616	23	0,19	0,016	0,16	0,22		
	Moderate	1152	43	0,13	0,01	0,11	0,15		
	Bad	773	28,9	0,09	0,01	0,07	0,11		
	Very bad	60	2,2	0,1	0,039	0,02	0,18		
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		
Restriction of vital activities related to health problems	Restricted	917	34,3	0,09	0,009	0,07	0,11	**0,000**	**0,777778**
	Not restricted	1759	65,7	0,16	0,009	0,14	0,18		
Asthma	No	2271	84,9	0,12	0,007	0,11	0,14	**0,000**	**1,748315**
	Yes	405	15,1	0,21	0,02	0,17	0,25		
Chronic bronchitis	No	2280	85,2	0,13	0,007	0,11	0,14	**0,000**	**2,136829**
	Yes	396	14,8	0,2	0,02	0,16	0,24		
Infarction	No	2515	94	0,14	0,007	0,12	0,15	0,629	
	Yes	161	6	0,15	0,028	0,09	0,2		
Coronary heart disease	No	2250	84,1	0,13	0,007	0,11	0,14	**0,006**	**0,349215**
	Yes	426	15,9	0,18	0,019	0,14	0,21		
Hypertension	No	1695	63,3	0,14	0,008	0,13	0,16	0,207	
	Yes	981	36,7	0,13	0,011	0,1	0,15		
Stroke/paralysis	No	2622	98	0,14	0,007	0,12	0,15	0,884	
	Yes	54	2	0,13	0,046	0,04	0,22		
Arthrosis	No	2152	80,4	0,13	0,007	0,12	0,14	**0,039**	**0,242933**
	Yes	524	19,6	0,16	0,016	0,13	0,2		
Lumbar region problems	No	1422	53,1	0,1	0,008	0,08	0,12	**0,000**	**1.870511**
	Yes	1254	46,9	0,18	0,011	0,16	0,2		
Neck region diseases	No	1796	67,1	0,11	0,007	0,1	0,13	**0,000**	**0,670478**
	Yes	880	32,9	0,18	0,013	0,16	0,21		
Diabetes	No	2156	80,6	0,14	0,007	0,12	0,15	0,576	
	Yes	520	19,4	0,13	0,015	0,1	0,16		
Allergies	No	2209	82,5	0,12	0,007	0,11	0,14	**0,000**	**0,732252**
	Yes	467	17,5	0,2	0,018	0,16	0,24		
Liver failure	No	2584	96,6	0,13	0,007	0,12	0,14	**0,000**	**0,46647**
	Yes	92	3,4	0,29	0,048	0,2	0,39		
Urinary incontinence	No	2233	83,4	0,13	0,007	0,11	0,14	0,005	
	Yes	443	16,6	0,18	0,018	0,14	0,21		
Kidney disease	No	2320	86,7	0,13	0,007	0,11	0,14	**0,000**	**0,511101**
	Yes	356	13,3	0,21	0,021	0,16	0,25		
Depression	No	2301	86	0,11	0,007	0,1	0,13	**0,000**	**0,764706**
	Yes	375	14	0,28	0,023	0,23	0,32		

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		N	%	Mean	Std.	IC		p value	EB (cohen d and η²-eta square)
Alzheimer's	No	2606	97,4	0,14	0,007	0,12	0,15	0,223	
	Yes	70	2,6	0,19	0,047	0,09	0,28		
Celiac	No	2666	99,6	0,14	0,007	0,12	0,15	0,737	
	Yes	10	0,4	0,1	0,1	-0,13	0,33		
Other chronic diseases	No	2378	88,9	0,13	0,007	0,12	0,14	**0,003**	**0,352941**
	Yes	298	11,1	0,19	0,023	0,15	0,24		
Wearing glasses	Wearing	1156	43,2	0,15	0,19	0,09	0,12	**0,000**	**0,12883**
	Not wearing	1520	56,8	0,17	0,011	0,15	0,19		
Defect of vision	Yes	1277	47,7	0,13	0,009	0,12	0,16	0,559	
	No	1399	52,3	0,13	0,009	0,11	0,15		
Wearing a hearing aid	Wearing	2564	95,8	0,13	0,031	0,06	0,19	0,720	
	Not wearing	112	4,2	0,14	0,007	0,12	0,15		
Hearing loss	Yes	2021	75,5	0,13	0,013	0,11	0,16	0,759	
	No	655	24,5	0,14	0,008	0,12	0,15		
Physical pain	No	0	0	.	.	.	.	**0,000**	**0,0332**
	Very little	643	24	0,08	0,01	0,06	0,1		
	Little	548	20,5	0,09	0,012	0,06	0,11		
	Medium	726	27,1	0,15	0,013	0,12	0,17		
	Much	571	21,3	0,18	0,016	0,15	0,21		
	Too much	188	7	0,31	0,034	0,24	0,38		
Pain preventing life	Yes	2325	86,9	0,15	0,007	0,13	0,16	**0,000**	**0,722806**
	No	351	13,1	0,07	0,014	0,05	0,1		
Distress	Yes	1508	56,4	0,19	0,01	0,17	0,21	**0,000**	**2,6**
	No	1168	43,6	0,06	0,007	0,05	0,08		
Feeling worthless	Yes	860	32,1	0,23	0,014	0,2	0,25	**0,000**	**1,264911**
	No	1816	67,9	0,09	0,007	0,08	0,11		
Receiving bed service for the last 12 months	Yes	571	21,3	0,17	0,016	0,14	0,2	**0,004**	**0,323911**
	No	2105	78,7	0,13	0,007	0,11	0,14		
Receiving daily service for the last 12 months	Yes	1755	65,6	0,15	0,009	0,13	0,17	**0,007**	**0,624695**
	No	921	34,4	0,11	0,01	0,09	0,13		
Getting service from the dentist	None	167	6,2	0,13	0,026	0,08	0,18	0,856	
	Got service	2509	93,8	0,14	0,007	0,12	0,15		
Getting service from family physician	None	233	8,7	0,17	0,025	0,12	0,22	0,101	
	Got service	2443	91,3	0,13	0,007	0,12	0,15		
Getting service from a specialist physician	None	66	2,5	0,14	0,043	0,05	0,22	0,999	
	Got service	2610	97,5	0,14	0,007	0,12	0,15		
Getting physiotherapist service for the last 12 months	None	2587	96,7	0,14	0,007	0,12	0,15	0,72	
	Got service	89	3,3	0,12	0,035	0,05	0,19		
Getting service from the physical therapist for the last 12 months	None	2457	91,8	0,13	0,007	0,12	0,15	0,143	
	Got service	219	8,2	0,17	0,025	0,12	0,22		

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		N	%	Mean	Std.	IC		p value	EB (cohen d and η²-eta square)
Getting psychologist service for the last 12 months	None	2603	97,3	0,13	0,007	0,12	0,15	0,081	
	Got service	73	2,7	0,21	0,048	0,11	0,3		
Getting psychotherapist service for the last 12 months	None	2658	99,3	0,14	0,007	0,12	0,15	0,080	
	Got service	18	0,7	0,28	0,109	0,05	0,51		
Getting psychiatrist service for the last 12 months	None	2534	94,7	0,13	0,007	0,12	0,15	0,055	
	Got service	142	5,3	0,19	0,033	0,12	0,26		
Getting outreach services	Yes	38	1,4	0,21	0,067	0,07	0,35	0,180	
	No	2638	98,6	0,14	0,007	0,12	0,15		
Prescribed drug use status	Yes	1607	60,1	0,14	0,009	0,13	0,16	0,185	
	No	1069	39,9	0,13	0,01	0,11	0,15		
The state of drug use by its own decision	Yes	936	35	0,17	0,012	0,15	0,2	**0,000**	**0,49029**
	No	1740	65	0,12	0,008	0,1	0,13		
Blood pressure measurement	Done	2499	93,4	0,14	0,007	0,12	0,15	0,674	
	Not done	177	6,6	0,15	0,027	0,09	0,2		
Cholesterol measurement status	Done	2205	82,4	0,12	0,007	0,11	0,14	**0,000**	**0,732252**
	Not done	471	17,6	0,2	0,018	0,16	0,23		
Blood glucose measurement status	Done	2296	85,8	0,13	0,007	0,11	0,14	**0,001**	**1,165543**
	Not done	380	14,2	0,19	0,02	0,15	0,23		
Stool occult blood test status	Done	858	32,1	0,16	0,013	0,14	0,19	**0,011**	**0,370593**
	Not done	1818	67,9	0,12	0,008	0,11	0,14		
Colonoscopy status	Done	388	14,5	0,13	0,017	0,1	0,17	0,883	
	Not done	2288	85,5	0,14	0,007	0,12	0,15		
Delay due to long appointment time	No	2222	83	0,1	0,006	0,08	0,11	**0,000**	**1,984556**
	Yes	454	17	0,33	0,022	0,29	0,37		
Delay due to transportation	No	2325	86,9	0,08	0,006	0,07	0,1	**0,000**	**2,04524**
	Yes	351	13,1	0,48	0,027	0,43	0,54		
Payment difficulty in dental care	No	2302	86	0,07	0,005	0,06	0,09	**0,000**	**3,656686**
	Yes	374	14	0,78	0,027	0,72	0,83		
Payment difficulty in drug	No	2440	91,2	0,07	0,005	0,06	0,09	**0,000**	**3,656686**
	Yes	236	8,8	0,78	0,027	0,72	0,83		
Payment difficulty in spiritual treatment	No	2574	96,2	0,11	0,006	0,1	0,12	**0,000**	**2,084679**
	Yes	102	3,8	0,75	0,043	0,66	0,83		
Tobacco use status	No	1943	72,6	0,12	0,007	0,1	0,13	**0,000**	**0,632456**
	Yes	733	27,4	0,19	0,014	0,16	0,22		
Exposure to tobacco smoke	No	2111	78,9	0,12	0,007	0,11	0,14	**0,000**	**0,732252**
	Yes	565	21,1	0,2	0,018	0,16	0,23		
Alcohol use status	No	1924	71,9	0,13	0,007	0,11	0,14	0,943	
	Yes	752	28,1	0,19	0,02	0,15	0,23		

(* Payment of treatment cost by the Social security institution (SGK), ** Payment of treatment cost Private health insurance (ÖSS), *** Payment of treatment cost General health insurance (GSS))

Table 2
Findings of Binary Regression Econometric Model

	1.Model					2.Model					3.Model			
	Coefficient	OR	P	% 95 CI		Coefficient	OR	P	% 95 CI		Coefficient	OR	P	%
Gender	,193	1,212	,181	,915	1,607	,163	1,177	,266	,883	1,567	,326	1,385	,142	,8
Age	-,040	,961	**,000**	,951	,970	-,039	,962	**,000**	,952	,972	-,027	,973	**,001**	,9
Education	-,143	,866	**,008**	,779	,963	-,155	,857	**,005**	,769	,955	-,120	,887	,109	,7
Marital status	-,013	,988	,896	,818	1,192	-,012	,988	,898	,818	1,193	-,057	,945	,675	,7
Household income	-,359	,698	**,000**	,618	,789	-,368	,692	**,000**	,612	,783	-,231	,794	**,007**	,6
Treatment cost SGK*	-1,027	,358	**,000**	,231	,556	-1,035	,355	**,000**	,229	,553	-1,036	,355	**,001**	,1
Treatment cost GSS**	,488	1,629	,052	,996	2,667	,479	1,614	,058	,985	2,646	1,061	2,889	**,003**	1,
Overall health status	-,156	,856	,116	,705	1,039	-,155	,856	,118	,705	1,040	-,098	,907	,487	,6
Physical pain	,181	1,198	**,025**	1,023	1,403	,185	1,203	**,022**	1,027	1,409	,161	1,174	,138	,9
Pain preventing life	,175	1,191	,055	,997	1,423	,172	1,187	,059	,993	1,419	,170	1,186	,172	,9
Disease status over 6 months	,165	1,180	,465	,757	1,837	,159	1,172	,483	,752	1,825	,064	1,066	,840	,5
Restriction of vital activities related to health problems	,187	1,206	,339	,821	1,772	,197	1,217	,316	,829	1,789	,233	1,263	,398	,7
Asthma	,127	1,135	,508	,779	1,655	,123	1,131	,520	,776	1,649	,014	1,014	,957	,6
Chronic bronchitis	,187	1,206	,330	,827	1,758	,187	1,206	,331	,827	1,759	,144	1,154	,579	,6
Infarction	-,186	,830	,510	,477	1,445	-,195	,823	,491	,472	1,435	-,530	,589	,190	,2
Coronary heart disease	,082	1,086	,647	,763	1,545	,092	1,097	,608	,771	1,561	,012	1,012	,962	,6
Stroke paralysis	-,425	,654	,352	,267	1,601	-,431	,650	,346	,265	1,593	,021	1,021	,970	,3
Lumbar region problems	,274	1,316	,053	,996	1,738	,274	1,316	,053	,996	1,738	,172	1,187	,375	,8
Neck region diseases	,257	1,293	,071	,978	1,709	,256	1,291	,073	,976	1,708	,086	1,090	,660	,7
Allergies	,319	1,375	**,041**	1,012	1,868	,317	1,374	**,042**	1,011	1,866	,166	1,181	,445	,7
Depression	,616	1,851	**,000**	1,369	2,503	,612	1,845	**,000**	1,363	2,496	,150	1,162	,536	,7
Alzheimer's	,266	1,304	,455	,650	2,618	,271	1,311	,448	,651	2,639	,176	1,192	,727	,4
Other chronic diseases	,422	1,524	**,023**	**,023**	2,190	,416	1,516	**,025**	1,055	2,179	,276	1,318	,278	,8
Status at work						,153	1,165	,339	,851	1,595	-,063	,939	,778	,6
Work continuity						,055	1,056	,727	,777	1,437	,014	1,014	,951	,6
Working method						,082	1,086	,707	,707	1,668	,085	1,089	,791	,5
Place of birth											,846	2,330	,368	,3
Citizenship											-1,460	,232	,195	,0
Defect of vision											,186	1,204	,328	,8
Wearing a hearing aid											,626	1,870	,112	,8
Hearing loss											,113	1,120	,615	,7
Distress											,390	1,477	,077	,9

ANNEX 1

1.Model	2.Model	3.Model			
Feeling worthless		,076	1,079	,709	,7
Receiving bed service for the last 12 months		-,014	,986	,947	,6
Receiving daily service for the last 12 months		-,089	,915	,642	,6
Getting physiotherapist service for the last 12 months		,778	2,177	,150	,7
Getting service from the physical therapist for the last 12 months		,127	1,136	,687	,6
Getting psychologist service for the last 12 months		-,089	,915	,861	,3
Getting psychotherapist service for the last 12 months		,622	1,863	,096	,8
Getting service from the dentist		,002	1,002	,997	,4
Getting service from family physician		,186	1,205	,529	,6
Getting service from a specialist physician		-,621	,537	,322	,1
Prescribed drug use status		-,390	,677	,053	,4
Blood pressure measurement		-,072	,931	,856	,4
Cholesterol measurement status		-,104	,902	,734	,4
Blood glucose measurement status		,416	1,516	,224	,7
Stool occult blood test status		-,364	,695	,053	,4
Colonoscopy status		,001	1,001	,997	,6
Delay due to long appointment time		,636	1,889	**,002**	1,
Delay due to transportation		1,468	4,341	**,000**	2,
Payment difficulty in dental care		2,433	11,394	**,000**	7,
Payment difficulty in drug		2,504	12,229	**,000**	7,
Tobacco use status		,093	1,098	,661	,7

ANNEX 1

	1.Model			2.Model			3.Model			
Exposure to tobacco smoke							,267	1,305	,207	,8
Alcohol use status							,121	1,128	,582	,7
Stationary	,152	1,164	,792	-,061	,941	,920	-3,595	,027	3,336	
Mcfadden R^2	0,1738			0.1744			0,5166			
LR Statistic	370,594			371,940			1101,447			
Prob LR Statistic)	0,0000			0,0000			0,0000			
H-L Statistic	12,0760			12,4009			7,8014			
Prob.Chi-Sq(8)	0,1478			0,1342			0,4531			

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: Univesity and Post graduate	
Marital status	1: Single 2: Married 3: Divorced 4: Spouse died	
Household income	1: 0–1264 Tl 2: 1265–1814 Tl 3: 1815–2540 Tl 4: 2541–3721 Tl 5: 3722 + Tl	
Place of birth	0: In Turkey 1: In another country	

ANNEX 1

	1.Model	2.Model	3.Model
Citizenship	0: Turkey citizens 1: Citizen of another country		
Treatment cost covered by sgk (social security institution)	0: Yes 1: No		
Treatment cost covered by öss (private health insurance)	0: Yes 1: No		
Treatment cost covered by gss (general health insurance)	0: Yes 1: No		
Treatment cost covered by herself/himself	0: Yes 1: No		
Reason for not working	1: Inability to find work / 0: Other reasons		
Status at work	1: Salary employee 0: Other		
Work continuity	1: Permanent employee 0: Other		
Working method	1: Full time 0: Part time		
Overall health status	5: Very Good 4: Good 3: Moderate 2: Bad 1: Very Bad		
Disease status over 6 months	1: Yes 0: No		
Restriction of vital activities related to health problems	1: Restriced 0: Not restricted		
Asthma	1: Yes 0: No		

ANNEX 1

	1.Model	2.Model	3.Model
Chronic bronchitis	1: Yes 0: No		
Infarction	1: Yes 0: No		
Coronary heart disease	1: Yes 0: No		
Hypertension	1: Yes 0: No		
Stroke/paralysis	1: Yes 0: No		
Arthrosis	1: Yes 0: No		
Lumbar region problems	1: Yes 0: No		
Neck region diseases	1: Yes 0: No		
Diabetes	1: Yes 0: No		
Allergies	1: Yes 0: No		
Liver failure	1: Yes 0: No		
Urinary incontinence	1: Yes 0: No		
Kidney disease	1: Yes 0: No		
Depression	1: Yes 0: No		
Alzheimer's	1: Yes 0: No		
Celiac	1: Yes 0: No		
Other chronic diseases	1: Yes 0: No		
Wearing glasses	1: Yes 0: No		
Defect of vision	1: Having 0: Not having		

ANNEX 1

	1.Model	2.Model	3.Model
Wearing a hearing aid	1: Yes 0: No		
Hearing loss	1: Having 0: Not having		
Physical pain status	1: No 2: Very little 3: Little 4: Medium 5: Much 6: Too much		
Pain preventing life	1: Hindering life 0: Not hindering life		
Distress	1: Yes 0: No		
Feeling worthless	1: Yes 0: No		
Receiving bed service for the last 12 months	1: No 0: Yes		
Receiving daily service for the last 12 months	1: Yes 0: No		
Getting service from the dentist	1:None 0:Got service		
Getting service from family physician	1:None 0:Got service		
Getting service from a specialist physician	1:None 0:Got service		
Getting physiotherapist service for the last 12 months	1: No 0: Yes		
Getting service from the physical therapist for the last 12 months	1: No 0: Yes		
Getting psychologist service for the last 12 months	1: No 0: Yes		
Getting psychotherapist service for the last 12 months	1: No 0: Yes		

ANNEX 1

	1.Model	2.Model	3.Model
Getting psychiatrist service for the last 12 months	1: No 0: Yes		
Getting outreach services	1: No 0: Yes		
Prescribed drug use status	1: No 0: Yes		
The state of drug use by its own decision	1: No 0: Yes		
Blood pressure measurement	1: Not done 0: Done		
Cholesterol measurement status	1: Not done 0: Done		
Blood glucose measurement status	1: Not done 0: Done		
Stool occult blood test status	1: Not done 0: Done		
Colonoscopy status	1: Not done 0: Done		
Delay because appointment time is too long	1: Yes 0: No		
Delay due to transportation problem	1: Yes 0: No		
Payment difficulty in medical care	1: Yes 0: No		
Payment difficulty in dental care	1: Yes 0: No		
Payment difficulty in drug	1: Yes 0: No		
Payment difficulty in spiritual treatment	1: Yes 0: No		
Tobacco use status	1:Yes 0: No		
Exposure to tobacco smoke	1: Yes 0: No		

ANNEX 1

	1.Model	2.Model	3.Model
Alcohol use status	1: Yes		
	0: No		
ANNEX 1			

----------TABLE 1----------

In the study, "cohen d" statistics for binary groups and "η^2-eta square" statistics for multiple groups were calculated in order to calculate the magnitude of the effects of variables on the dependent variable. According to effect-size statistics, variables that affect payment difficulty at a high level in medical care are treatment costs, SGK and GSS treatment costs, chronic asthma, chronic bronchitis, chronic lumbar disease, depression, feeling worthless, blood glucose measurement, delay due to long appointment time, delay due to transportation, payment difficulty in dental care, drug and spiritual treatment (cohen $d \geq 0,8$). Variables that moderately affect payment difficulty in medical care are self-treatment cost, reason for not working, work continuity, disease status over 6 months, restriction of vital activities related to health problems, chronic neck disease, chronic allergy, chronic kidney disease, chronic depression, pain preventing life, receiving daily service for the last 12 months, cholesterol measurement status, tobacco use status and exposure to tobacco smoke ($0,8 >$ coden $d \geq 0,5$). Variables that weakly affect payment difficulty in medical care are education, household income, working method, overall health status, coronary heart disease, arthrosis, liver failure, other chronic diseases, wearing glasses, physical pain, pain preventing life, receiving bed service for the last 12 months, the state of drug use by its own decision and stool occult blood test status (cohen $d < 0,5$).

----------TABLE 2----------

According to Model 1 results, the physical pain status of individuals increases the probability of payment difficulty in medical care by 1.19 times, allergy by 1.37 times, depression by 1.85 times and other chronic diseases by 1.52 times. Each year's increase in the age of individuals reduces the possibility of payment difficulties in medical care by 0,96 times. The increase in individuals' education levels reduces the probability of payment difficulties in medical care by 0.86 times. Increases in the household income of individuals reduce the probability of payment difficulties in medical care by 0,69 times and having SGK reduces the possibility of payment difficulties in medical care by 0.35 times.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 Model 1 is in accordance with the established model.

According to Model 2 results, the physical pain status of individuals increases the probability of payment difficulty in medical care by 1.20 times, allergy by 1.37 times, depression by 1.84 times and other chronic diseases by 1.51 times.. Each year's increase in the age of individuals reduces the possibility of payment difficulties in medical care by 0,96 times. The increase in individuals' education levels reduces the probability of payment difficulties in medical care by 0.85 times. Increases in the household income of individuals reduce the probability of payment difficulties in medical care by 0,69 times and having SGK reduces the possibility of payment difficulties in medical care by 0.35 times. It is inferred from the Hosmer-Lemeshow test statistic that the data used in Model 2 is in accordance with the established model.

According to the results of the analysis of Model 3, having general health insurance increases the probability of payment difficulties by 2.88 times, the delayed experience due to long duration of taking appointment is 1.88 times, the delay due to distance or transportation problems is 4.34 times, having payment difficulty in dental care is 11.39 times, and having difficulty in buying medication is 12.22 times. Each year's increase in the age of individuals reduces the possibility of payment difficulties in medical care by 0,97 times. The increase in individuals' education levels reduces the probability of payment difficulties in medical care by 0.79 times. Having SGK reduces the possibility of payment difficulties in medical care by 0.35 times. It is inferred from the Hosmer-Lemeshow test statistic that the data used in this study is in accordance with the established model.

4. 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 paying difficulty in medical care. Studies conducted 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 significant factor. Similarly, birthplace and citizenship variables are among the variables that have no significant effect unlike other study results [36, 39].

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].

When the study examined the incidence of eighteen chronic diseases in the population, the rates ranged from 2–46%. The most common chronic disease is the lumbar region problems. The least common chronic disease is stroke/paralysis. According to the dependent variable of "payment difficulty in medical care", chronic disease groups with a statistically significant difference between chronic disease and non-chronic disease groups; asthma, bronchitis, coronary heart failure, arthrosis, lumbar region problems, neck region problems, allergies, liver failure, kidney disease, depression and other chronic diseases. Chronic

disease groups with no significant difference; infarction, hypertension, stroke/paralysis, diabetes, urinary incontinence, Alzheimer's. In similar studies in the literature [37], chronic diseases have a significant effect on unmet health care.

In the study conducted by Kim et al. [26], there was no significant difference for tobacco and alcohol use variables but it was observed that the variables of tobacco use and tobacco smoke exposure affected unmet health services in this study. In contrast to the literature [26] on the causality relationship between mental health parameters and health services that are not met, it was determined that these parameters were not effective in this study. In addition, no significant effect on healthcare, which is not met by variables related to the services received from healthcare professionals, was detected.

5. 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, whether patients are applying to 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 the 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 own statements rather than medical records. It is possible that 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.

6. Result

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, especially when we rank the other components of the concept of payment difficulties and those with the highest impact rate, the variables of not having the financial power to spend drug expenditures, paying difficulty in dental care, access problems arising from transportation and not getting appointment are the variables that explain unmet medical needs. 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 on econometric models of the comparative burden of different chronic situations and demographic indicators.

Abbreviations

KMO
Kaiser-Meyer-Olkin
TL
Turkish Lira
SGK
Payment of treatment cost by the Social security institution
ÖSS
Payment of treatment cost Private health insurance
GSS
Payment of treatment cost General health insurance

Declarations

Ethics approval and consent to participate: Not applicable.

Consent for publication: Not applicable.

Availability of data and materials: The data that support the findings of this study are available from Turkish Statistical Institute (TurkStat) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of TurkStat (http://www.tuik.gov.tr/Start.do).

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