İzmir İktisat Dergisi
İzmir Journal of Economics

ISSN:1308-8173 **E-ISSN:** 1308-8505 **YIL:** 2020 **Cilt:** 35 **Sayı:** 2 **Sayfa:** 403-414
Geliş Tarihi: 25.03.2020 **Kabul Tarihi:** 13.05.2020 **Online Yayın:** 29.06.2020 **Doi:** 10.24988/ije.202035213
ÖZGÜN ARAŞTIRMA

Kronik Hastalıklar İşe Devamsızlığı Ne Kadar Etkilemektedir?

Dilek ŞAHİN[1] , Mehmet Nurullah KURUTKAN [2] Oğuz KARA[3]

Özet

Bu çalışmanın amacı kronik hastalıkların ve sosyo-demografik faktörlerin işe devamsızlık üzerindeki etkilerini belirlemektir. Kronik hastalığa ait verilerin ve sosyo-demografik değişkenlerin devamsızlığı etkileme derecesini tespit etmek için üç model kurulmuştur. Modellerin analizinde Binary Logit Regresyon analizi kullanılmıştır. Analizde kullanılan değişkenler 2016 yılına ait "TÜİK Sağlık Araştırması" mikro veri setinden elde edilmiştir. Kişide kroner kalp hastalığının varlığı, inme-felç hastalığı, bel ve boyun bölgesi problemleri, alerji ve böbrek hastalığının işe devamsızlığı arttırdığı belirlenmiştir. Araştırma sonuçlarına göre kronik hastalıkların ve sosyo-demografik değişkenlerin hastalık devamsızlığında etkili olduğu belirlenmiştir.

Anahtar kelimeler: İşe devamsızlık, kronik hastalıklar, ulusal sağlık araştırması
Jel Kodu: E24, I11, I15, J64

How Much Do Chronic Diseases Affect Absenteeism?

Abstract

The aim of this study is to determine the effects of chronic diseases and socio-demographic factors on sickness absenteeism. Three models are to established to determine the degree of influence of chronic disease and socio-demographic variables on absenteeism. Binary Logit Regression analysis is used for the analysis of the models. Micro data set of "Turkish Statistical Institute" Health Survey in 2016 is used. Coronary chronic heart disease, stroke, back diseases, neck diseases, allergy, liver failure, kidney disease and depression were determined positively affecting absenteeism. According to the results of the study, chronic diseases and socio-demographic variables are found to be effective in sickness absenteeism.

Keywords: Absenteeism, chronic diseases, national health survey
Jel Codes: E24, I11, I15, J64

1. INTRODUCTION

The absenteeism of the employee was examined by various disciplines as a multidimensional concept concerning its causes and consequences. The disciplines that focus on absenteeism are public and environmental health, management (especially the field of organizational behavior), applied psychology, economics, health care services, education, industrial relations, and business sciences. Besides, studies that describe absenteeism as a school, employee, workplace and absenteeism are available. These studies focused on the antecedents of absenteeism, its cost, and the productivity losses it leads to. Labor turnover rate, organizational participation, job tension, organizational stress, satisfaction, burnout, job performance, psychosomatic complaints, workplace dynamics, smoking, alcohol consumption, work attitudes hand hygiene, and unfair work environment, etc. concepts are one of the main subjects studied together with the subject of absenteeism.

Recent health-related studies have been investigating absenteeism concerning health and lifestyle-related risk factors. Physical diseases such as heart (Lakic et al., 2014; Lyszczarz, 2018), kidney diseases (Richardson et al., 2018; Wang et al., 2016), migraine, chronic back and neck pain (Mesas et al., 2014), asthma (Hansen et al., 2012), stroke

ATIF ÖNERİSİ (APA): Şahin, D., Kurutkan, M.N., Kara, O. (2020). How Much Do Chronic Diseases Affect Absenteeism?. İzmir İktisat Dergisi. 35(2). 403-414. Doi: 10.24988/ije.202035213
[1] Dr. Öğr. Üyesi Dilek ŞAHİN, Düzce Üniversitesi, İşletme Fakültesi, DÜZCE, dileksahin@duzce.edu.tr
ORCID: 0000-0003-0865-7763
[2] Doç. Dr. Mehmet Nurullah KURUTKAN, Düzce Üniversitesi, İşletme Fakültesi, DÜZCE, nurullahkurutkan@duzce.edu.tr
ORCID: 0000-0002-3740-4231
[3] Doç. Dr. Oğuz KARA, Düzce Üniversitesi, İşletme Fakültesi, DÜZCE, oguzkara@duzce.edu.tr
ORCID: 0000-0002-8934-5608

(Brüggenjürgen et al., 2007), diabetes (Malinowski et al., 2016) and mental illnesses such as depression (Claxton et al., 1999; Evans-Lacko & Knapp, 2016) were associated with absenteeism. Depression has a significant negative impact on time management and productivity (Evans-Lacko & Knapp, 2016). Recent researches show that the level of absenteeism caused by obesity has increased (Frone, 2008). Besides, lifestyle factors such as smoking (Halpern, 2001) and alcohol use (Bacharach et al., 2010) and feeling of well-being (Prottas, 2008) are similarly linked to absenteeism.

From a social perspective, the economic burden of disease is calculated by both direct and indirect costs. Indirect costs are usually loss of productivity as a result of death, long-term disability, short-term absenteeism or presenteeism. The costs of absenteeism are examined under the heading of indirect costs (Drummond et al., 2005; Hemp, 2004; Zhang et al., 2016).

Health and socioeconomic factors linked to chronic health conditions are critical in influencing workplace productivity and workplace health. Low productivity due to sickness includes the degree of failure to be completely excluded from the role undertaken (temporary interruption of work) (absenteeism) and the inability to demonstrate the usual workforce and performance in the work process (presenteeism) (Baptista et al., 2019; Wee et al., 2019).

Chronic diseases (physical and mental) cause individuals to be unable to play their roles and disrupt society's ability to live in optimal health and pose a burden to society (Ejebu & Skåtun, 2018). Losses in health status due to chronic diseases adversely affect governments, companies and other organizations and lead them to take precaution (Baptista et al., 2019).

From a financial perspective, productivity loss is one of the justifications for investments in improving workplace health (Baptista et al., 2019). Researches show that indirect costs are too high, and even these costs are estimated to exceed medical and pharmaceutical expenditures (Wee et al., 2019). The prevalence of the chronic disease in the United States has a historic high. A recent study of working-age adults found that 68% suffered from at least one chronic condition. The Milken Institute estimates that productivity loss due to chronic disease exceeded $ 1 trillion in 2003 and would triple in the next 20 years (DeVol et al., 2007). Conference Board of Canada estimated that the cost of absenteeism in the Canadian economy was the US $ 16.6 billion in 2011 (Zhang et al., 2016). Loss of productivity, assessed by sickness absenteeism, is considered a way of measuring economic performance (Baptista et al., 2019).

From an employer's perspective, it is important to estimate the total economic burden of chronic medical conditions on employees. To invest with limited resources, it is vital for the employer to identify which health risks and chronic diseases are prevalent. Employers, health insurers and policymakers have a growing interest in predicting productivity loss caused by workers ' health conditions (Baptista et al., 2019).

The most commonly used individual-level measurements on absenteeism consist of three indicators based on:

1. Attitude based on registration or self-declaration of persons (number or rate of single-day absences),
2. Frequency (number of times absent or rate of this kind of absence)
3. Time lost absence (total number of days or rate of days absent) (Darr & Johns, 2008).

In the calculation of absenteeism days, different calculation techniques were developed from 3 months to one year (Darr & Johns, 2008). Absenteeism under this research covers a period of 12 months.

This study aims to determine the degree to which chronic diseases (supported by socio-demographic factors) affect the disease-related

absenteeism (sickness absenteeism) in the last twelve months.

In this research, many chronic diseases and socio-demographic variables have been handled together. Three different models (simple, intermediate and comprehensive) were established to determine the factors affecting absenteeism. In all three models, the dependent variable is the absenteeism in the last 12 months and the independent variables in the first model are asthma, bronchitis, chronic heart disease, hypertension, stroke-paralysis, arthrosis, waist area pain, neck area pain, diabetes, allergy, liver failure, kidney problems, depression, pain, gender, and education. In the second model, household income, alcohol and cigarette use variables were added to the independent variables in the simple model. In the third level model, the variables in the previous model included sports, walking, body mass index, work status, work continuity, and general health perception.

2. DATA SET AND METHOD

"The 2016 Health Survey" was used in this study. The Health Survey is carried out every 2 years by TurkStat (Turkish Statistical Institute) and the most recent survey is for the year 2016. Its scope is households located in all settlements within the borders of Turkey. The institutionally qualified population (soldiers, those who remain permanently in dormitories, prisons, nursing homes and hospitals, etc.) are out of scope, as well as settlements (small villages, hamlets, etc.) (number of addresses smaller than 20) where it is thought that sufficient number of sample households could not be reached were excluded. The data set was stratified and a two-stage cluster sampling methodology was used. 9470 household addresses were selected and searched to collect information on health indicators. The total number of observations in the data set is 23,606. In this study, the total number of observations first fell to 17,242, as information about individuals older than 15 years was used. Then, since only active workers were included in the study, the number of observations in the study decreased from 17242 people to 6457 people. When 6457 individuals were organized to include all variables (chronic diseases and socio-demographic factors), the number of observations included in econometric analyses consisted of 3022 individuals. All variables, variable definitions and data sources used in the analyses are shown in Appendix 1.

The binary logistic regression analysis method was used to determine the chronic diseases and socio-demographic factors affecting the absenteeism in the last 12 months. It is possible to summarize the working algorithm of Logit model analyses as follows.

The Logit method is used as an alternative to discriminant analysis and cross tables in the case of various hypothesis distortions (such as normality, having common covariance). It is also used as an alternative to linear regression analysis if the dependent variable is binary such as 0/1, or a discrete variable with more than two levels (polychotomous) due to the hypothesis distortions (Kaşko, 2007).

In Logit models, factor change=odds ratio can be used in coefficient interpretations. In the dummy variable, while all other variables are constant, $exp(\beta k)$ gives the difference rate or factor change, for standardized factor change, $exp(\beta k * sk)$ is calculated while all other variables are constant and here sk = standard deviation; in quantitative variables, percentage change is found with $(exp(\beta - 1) * 100$. Independent variables can be standardized with simple algebra (Emeç, 2002).

For a linear probability model defined as $P_i = \beta_0 + \beta_1 X_i$ the logistic cumulative distribution function can be written as follows to indicate the probability that the P_i Decision Unit will perform a particular preference.

$$P_i = E(Y_i = 1/X_i) = F(I_i) = F(\beta_0 + \beta_1 X_i)$$

$$= \frac{1}{1+e^{-I_i}} = \frac{1}{1+e^{-(\beta_0+\beta_1 X_i)}} \qquad \text{Equation 1}$$

"e" in the equation expresses the natural logarithm base, whereas the I_i benefit index is between $-\infty$ and $+\infty$ and P_i is between 0 and 1. As you can see, there is a relationship

between P_i and I_i that cannot be described linearly. To make this non-linear relationship predictable, it is possible to convert it to a linear format by performing some mathematical operations. The following equation is obtained by taking into account that the probability of the decision unit performing a choice is P_i and the probability of not performing is $1 - P_i$.

$$P_i = \frac{1}{1+e^{-I_i}} \rightarrow 1 + e^{-I_i} = \frac{1}{P_i} \rightarrow e^{-I_i} = \frac{1-P_i}{P_i} \rightarrow e^{-I_i} = \frac{P_i}{1-P_i} \qquad \text{Equation 2}$$

In the equation $\frac{P_i}{1-P_i}$ is the ratio of the probability of the decision unit to choose to the probability of not realizing it. This ratio is called "Odds Ratio". The odds ratio is a ratio of two odds. It is a ratio that summarizes the relationship between two variables. Logit is the natural logarithm of the odds ratio. As the odds ratio is asymmetrical, the natural logarithm is taken and made symmetrical. Logit is the equivalent of the β coefficient in linear regression analysis. To write the above function in a linear form, if the natural logarithm of both sides of the equation is taken at the base e, the following equation is obtained.

$$L_i = Ln\left(\frac{P_i}{1-P_i}\right) = I_i = \beta_0 + \beta_1 X_i \qquad \text{Equation 3}$$

In fact, L_i is referred to as the natural logarithm of the odds ratio, and L_i is in a linear relationship with both X_i and coefficients. Here, L_i is essentially expressed as the natural logarithm of the odds ratio. L_i is involved in a linear relationship with both X_i and coefficients (Gujarati, 2012).

3. FINDINGS

A chi-square test was used to determine whether there is a significant difference between each variable. Discriminant analysis was used to determine whether age and body mass index affect the absenteeism.

Table 1. Variance Analysis of Variables

Variables	Variable description	N	%	Mean (95% CI) (Lower, Upper)	Std. deviation	Prob.
Age	15-75 age	-	-	40,20	12,265	**0,000**
Body mass index	14.69-53.33	-	-	26,21	4,507	0,250
Education level	He/She didn't finish any school, Illiterate	340	5,3	0,05 (0,03-0,08)	0,227	**0,000**
	Primary school	2137	33,1	0,14 (0,12-0,16)	0,349	
	Secondary school	517	8,0	0,14 (0,10-0,19)	0,349	
	Vocational or technical secondary school	13	0,2	0,40 (-0,28-1,08)	0,349	
	Primary education	467	7,2	0,21 (0,15-0,28)	0,412	
	High school or vocational high school	1359	21,0	0,17 (0,14-0,20)	0,376	
	2 or 3-year college	438	6,8	0,25 (0,19-0,32)	0,437	
	4-year college or faculty	993	15,4	0,14 (0,11-0,18)	0,349	
	Master's degree	167	2,6	0,18 (0,09-0,28)	0,389	
	PhD	26	0,4	0,08 (-0,10-0,27)	0,083	
Household income	0 - 1264 TL	907	14,0	0,11 (0,08-0,14)	0,314	0,087
	1265- 1814 TL	1543	23,9	0,16 (0,14-0,19)	0,369	
	1815- 2540 TL	1182	18,3	0,15 (0,12-0,18)	0,356	
	2541 - 3721 TL	1299	20,1	0,17 (0,13-0,20)	0,372	
	3722 + TL	1526	23,6	0,16 (0,13-0,19)	0,369	
Gender	Female	4399	68,1	0,16 (0,14-0,18)	0,367	0,845
	Male	2058	31,9	0,14 (0,12-0,16)	0,347	
Alcohol use	No	4088	63,3	0,13 (0,12-0,15)	0,337	**0,000**
	Yes	2369	36,7	0,19 (0,17-0,21)	0,337	
Cigarette smoking	Never	2685	41,6	0,12 (0,10-0,14)	0,325	**0,000**
	I quit smoking	982	15,2	0,16 (0,12-0,19)	0,363	
	Yes, sometimes	335	5,2	0,14 (0,08-0,19)	0,346	
	Yes, everyday	2455	38,0	0,19 (0,17-0,21)	0,391	

Table 1. Variance Analysis of Variables (Continuous)

Variables	Variable description	N	%	Mean (95% CI) (Lower, Upper)	Std. deviation	Prob.
Sport	I have never performed such physical activity	5914	91,6	0,15 (0,14-0,16)	0,357	0,183
	At least 1 day a week and 10 minutes	543	8,4	0,18 (0,12-0,23)	0,381	
Walking	I have never performed such physical activity	890	13,8	0,14 (0,10-0,17)	0,343	0,171
	At least 1 day a week and 10 minutes	5567	86,2	0,15 (0,14-0,17)	0,362	
Work status	Salaried or paid	4625	71,6	0,18 (0,16-0,20)	0,384	**0,000**
	Employer	232	3,6	0,13 (0,07-0,20)	0,342	
	On one's own	1051	16,3	0,10 (0,08-0,13)	0,306	
	Unpaid family worker	549	8,5	0,07 (0,04-0,09)	0,248	
Continuity of employment	Temporary or limited time work	583	9,0	0,16 (0,12-0,21)	0,371	0,688
	Permanent	5874	91,0	0,15 (0,14-0,16)	0,358	
Working method	Part time	317	4,9	0,12 (0,07-0,16)	0,320	0,281
	Full time	6140	95,1	0,15 (0,14-0,17)	0,361	
General health status	Too bad	17	0,3	0,13 (-0,06-0,31)	0,342	**0,000**
	Bad	294	4,6	0,18 (0,13-0,23)	0,387	
	Normal	1526	23,6	0,19 (0,17-0,21)	0,393	
	Good	3896	60,3	0,13 (0,11-0,14)	0,332	
	Very good	724	11,2	0,11 (0,07-0,15)	0,312	
Prevention of life in 4 weeks of pain	Never	731	11,3	0,13 (0,11-0,15)	0,336	**0,000**
	Very little	1111	17,2	0,13 (0,11-0,15)	0,334	
	Normal	775	12,0	0,18 (0,15-0,21)	0,386	
	Pretty much	335	5,2	0,19 (0,15-0,24)	0,396	
	Too much	70	1,1	0,23 (0,13-0,33)	0,423	
Asthma	No	6131	95,0	0,15 (0,14-0,17)	0,361	0,834
	Yes	326	5,0	0,12 (0,08-0,16)	0,326	
Bronchitis	No	6155	95,3	0,15 (0,14-0,17)	0,360	0,367
	Yes	302	4,7	0,14 (0,09-0,19)	0,349	
Coronary heart	No	6188	95,8	0,15 (0,13-0,16)	0,354	**0,000**
	Yes	269	4,2	0,23 (0,17-0,29)	0,421	
Hypertension	No	5834	90,4	0,15 (0,14-0,17)	0,359	0,121
	Yes	623	9,6	0,15 (0,12-0,19)	0,359	
Stroke-paralysis	No	6441	99,8	0,15 (0,14-0,16)	0,358	**0,000**
	Yes	16	0,2	0,50 (0,12-0,88)	0,527	
Arthrosis	No	6152	95,3	0,15 (0,14-0,17)	0,360	0,162
	Yes	305	4,7	0,14 (0,10-0,19)	0,351	
Waist area problems	No	4772	73,9	0,13 (0,11-0,15)	0,337	**0,000**
	Yes	1685	26,1	0,18 (0,16-0,20)	0,386	
Neck area problems	No	5429	84,1	0,14 (0,13-0,16)	0,351	***0,000***
	Yes	1028	15,9	0,17 (0,15-0,20)	0,379	
Diabetes	No	6079	94,1	0,15 (0,14-0,16)	0,358	0,077
	Yes	378	5,9	0,16 (0,12-0,21)	0,371	
Allergies	No	5846	90,5	0,14 (0,13-0,16)	0,351	**0,000**
	Yes	611	9,5	0,21 (0,12-0,25)	0,407	
Liver failure	No	6387	98,9	0,15 (0,14-0,16)	0,357	**0,015**
	Yes	70	1,1	0,24 (0,12-0,35)	0,429	
Kidney	No	6144	95,2	0,15 (0,13-0,16)	0,352	**0,000**
	Yes	313	4,8	0,23 (0,18-0,29)	0,424	
Depression	No	6091	94,3	0,15 (0,13-0,16)	0,354	**0,000**
	Yes	366	5,7	0,20 (0,15-0,25)	0,401	

Note: Discriminant analysis was used to determine whether age and body mass index affect the absenteeism.

The average age of the people in the study was 40.20 (SD ± 12,265) and the average body mass index was 26.21 (SD ± 4,507) (Table 1). Most of the participants were primary school graduates (49.1%), women (68.1%), salaried (71.6%) and permanent (91.0%) employees. In terms of the

absenteeism over the last twelve months; age, education, alcohol use and cigarette smoking, work status, general health status, pain, coronary heart disease, stroke-paralysis, waist area problems, neck area problems, allergies, liver failure, kidney diseases, and depression were effective.

According to the binary regression findings in Table 2, individuals experiencing coronary heart disease increases the probability of absenteeism in the last twelve months by 1.68 times. Stroke-paralysis disease 5.67 times, waist area problems 1.45 times, allergies 1.51 times, kidney problems 1.64 times increases the probability of absenteeism in the last twelve months. The increase in pain levels of individuals increases the probability of absenteeism by 1.19 times. Each year's increase in the age of individuals decreases the probability of absenteeism by 0.97 times. Being a woman increases the probability of absenteeism by 0.76 times. The increase/improvement in individuals ' education levels increases the probability of absenteeism in the last twelve months by 1.05 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 selected analysis method (Table 2)

Table 2. Binary Regression Results (Model 1)

				% 95 Confidence	
Variables	Coefficient	OR	p	Lower	Upper
Asthma	-0,4069	0,6657	**0,0890**	0,4163	1,0645
Bronchitis	-0,1283	0,8796	0,5890	0,5525	1,4003
Coronary heart	0,5237	1,6883	**0,0080**	1,1452	2,4890
Hypertension	0,1177	1,1249	0,4940	0,8029	1,5760
Stroke-paralysis	1,7368	5,6794	**0,0080**	1,5693	20,553
Arthrosis	-0,1691	0,8444	0,4330	0,5531	1,2890
Waist area	0,3723	1,4511	**0,0010**	1,1563	1,8210
Neck area	0,0393	1,0401	0,7550	0,8125	1,3316
Diabetes	0,1782	1,1951	0,3680	0,8105	1,7621
Allergy	0,4125	1,5106	**0,0050**	1,1360	2,0087
Liver failure	0,2841	1,3286	0,4110	0,6747	2,6164
Kidney	0,5001	1,6488	**0,0050**	1,1617	2,3403
Depression	0,1845	1,2026	0,2720	0,8653	1,6713
Pain	0,1904	1,2097	**0,0000**	1,0884	1,3445
Age	-0,0287	0,9718	**0,0000**	0,9619	0,9817
Gender	-0,2736	0,7606	**0,0140**	0,6116	0,9459
Education	0,0524	1,0538	**0,0230**	1,0074	1,1023
Constant	-1,4773	0,2283	0,0000	0,1297	0,4016
Observation	3022				
LR Chi2(27)	118,91				
Prob>chi2	0				
Pseudo	0,0462				
H-L chi2 (8)	10,64				
Prob > chi2	0,2227				

H-L: Hosmer-Lemeshow, OR: Odds Ratio

In Model 2, individuals experiencing chronic heart disease increase the probability of absenteeism in the last twelve months by 1.67 times. Stroke-paralysis is 6.03 times, waist area problems 1.43 times, allergies 1.51 times, kidney problems 1.66 times increases the probability of absenteeism in the last twelve months. The increase in the pain levels of individuals increases the probability of absenteeism by 1.21 times. Each year's increase in the age of individuals decreases the probability of absenteeism by 0.97 times. Alcohol use increases the probability of absenteeism by 1.30 times and smoking increases by 1.12 times (Table 3).

Table 3. Binary Regression Results (Model 2)

				% 95 Confidence	
Variables	Coefficient	OR	p	Lower	Upper
Asthma	-0,3643	0,6947	0,1300	0,4336	1,1128
Bronchitis	-0,1383	0,8708	0,5610	0,5461	1,3886
Coronary heart	0,5163	1,6759	**0,0100**	1,1313	2,4826
Hypertension	0,1489	1,1606	0,3890	0,8271	1,6285
Stroke-paralysis	1,7980	6,0374	**0,0060**	1,6541	22,0367
Arthrosis	-0,1544	0,8570	0,4770	0,5603	1,3108
Waist area	0,3634	1,4383	**0,0020**	1,1454	1,8060
Neck area	0,0200	1,0202	0,8740	0,7960	1,3075
Diabetes	0,1780	1,1949	0,3720	0,8083	1,7664
Allergy	0,4159	1,5158	**0,0040**	1,1388	2,0175
Liver failure	0,3383	1,4026	0,3310	0,7088	2,7755
Kidney	0,5087	1,6631	**0,0050**	1,1688	2,3664
Depression	0,1369	1,1467	0,4180	0,8233	1,5971
Pain	0,1910	1,2105	**0,0000**	1,0888	1,3459
Age	-0,0296	0,9709	**0,0000**	0,9608	0,9810
Gender	-0,1134	0,8928	0,3480	0,7047	1,1311
Education	0,0243	1,0246	0,3620	0,9725	1,0796
Alcohol use	0,2665	1,3054	**0,0200**	1,0428	1,6340
Cigarette use	0,1191	1,1265	**0,0050**	1,0375	1,2232
Household inc	0,0644	1,0665	0,1520	0,9766	1,1648
Constant	-1,9779	0,1384	0,0000	0,0737	0,2599
Observation	3022				
LR chi2(27)	139,4100				
Prob>chi2	0,0000				
Pseudo	0,0541				
H-L chi2 (8)	5,71				
Prob > chi2	0,6799				

Table 4. Binary Regression Results (Model 3)

				% 95 Confidence	
Variables	Coefficient	OR	p	Lower	Upper
Asthma	-0,4592	0,6318	0,0590	0,3925	1,0170
Bronchitis	-0,2070	0,8130	0,3880	0,5083	1,3002
Coronary heart	0,3646	1,4400	0,0720	0,9675	2,1432
Hypertension	0,0977	1,1026	0,5780	0,7813	1,5562
Stroke-paralysis	1,7020	5,4850	**0,0120**	1,4570	20,6488
Arthrosis	-0,1019	0,9031	0,6410	0,5883	1,3864
Waist area	0,3257	1,3850	**0,0060**	1,1004	1,7432
Neck area	-0,0354	0,9652	0,7810	0,7522	1,2386
Diabetes	0,1261	1,1344	0,5360	0,7608	1,6917
Allergy	0,3851	1,4698	**0,0090**	1,1018	1,9606
Liver failure	0,3341	1,3967	0,3380	0,7053	2,7657
Kidney	0,4855	1,6250	**0,0070**	1,1403	2,3156
Depression	0,0793	1,0825	0,6440	0,7738	1,5144
Pain	0,1480	1,1595	**0,0070**	1,0405	1,2921
Age	-0,0284	0,9720	**0,0000**	0,9614	0,9828
Gender	-0,0624	0,9395	0,6120	0,7382	1,1957
Education	0,0113	1,0114	0,6820	0,9580	1,0677
Alcohol use	0,2759	1,3177	**0,0170**	1,0511	1,6520
Cigarette use	0,0972	1,1021	**0,0230**	1,0135	1,1985
Household inc	0,0552	1,0567	0,2390	0,9640	1,1583
Sport	0,0209	1,0211	0,7100	0,9147	1,1398
Walking	-0,0011	0,9989	0,9560	0,9612	1,0381
Body mass index	-0,0065	0,9935	0,6000	0,9697	1,0180
Work status	-0,2719	0,7619	**0,0000**	0,6728	0,8629
Continuity of empl	-0,0407	0,9601	0,8350	0,6542	1,4090
Working method	0,1570	1,1700	0,5530	0,6969	1,9642
General health st.	-0,3909	0,6764	**0,0000**	0,5737	0,7976
Constant	0,1236	1,1316	0,8410	0,3389	3,7777
Observation	3022				
LR chi2(27)	182,58				
Prob>chi2	0				
Pseudo	0,0709				
H-L chi2 (8)	5.24				
Prob > chi2	0.7316				

In Model 3, stroke-paralysis increases the probability of absenteeism in the last twelve months by 5.48 times. Waist area problems 1.38 times, allergies 1.46 times, kidney problems 1.62 times increases the probability of absenteeism in the last twelve months. The increase in the pain levels of individuals increases the probability of absenteeism by 1.15 times. Each year's increase in the age of individuals decreases the probability of absenteeism by 0.97 times. Alcohol use increases the probability of absenteeism by 1.31 times and smoking increases by 1.10 times. Continuous employment increases the probability of absenteeism by 0.96 times compared to temporary or limited-time employment. An improvement in general health status reduces the probability of absenteeism by 67% in the last twelve months (Table 4).

4. DISCUSSION

The incidence of fourteen chronic diseases in the population varies between 0.2% and 26.1%. The most common chronic disease is a pain in the waist area. The least common chronic disease is a stroke. According to the dependent variable of absenteeism in the last two months, chronic disease groups with statistically significant differences between chronic disease and non-chronic disease groups are coronary heart disease, stroke-paralysis, waist area problems, neck area problems, allergies, liver failure, kidney diseases, and depression diseases. No significant differences were detected in bronchitis, hypertension, arthrosis, and diabetes. According to Lyszczarz's (2018) study in Poland, the rate of absenteeism due to heart failure (3.3-4%) was determined to be 4.2% in our study.

The rate of absenteeism increases for the stage of the disease concerning kidney disease. Absenteeism begins at the third stage and reaches its peak at the stage of renal failure (Wang et al., 2016). It is not possible to compare the stages of the disease in the research data because there is no data on the stages of the disease, but it has been determined that kidney disorders are effective in absenteeism.

In terms of gender, the study conducted on employees in the database of a regional bank in France shows that both presenteeism and absenteeism vary according to gender. Accordingly, while other factors are equal, women experience less presenteeism while experiencing more and longer absenteeism. The reason for this is explained by the social roles imposed on women. Similar results were obtained in our study. In terms of age variable, many studies on generational conflicts at work found that older employees avoided absenteeism as much as possible, while younger employees did not hesitate to get sick leave reports (Bierla et al., 2013). Results supporting both findings were obtained in our study.

The more the health status of employees is perceived as bad, the more absenteeism is. A study conducted between 1999 and 2003 confirms that absenteeism among public and private sector employees in Sweden is an independent predictor of general health status (Bergström et al., 2009). In our study, an improvement in general health status reduced the probability of absenteeism by 67% in the last twelve months.

According to Kandemir's study in 2014, the most chronic diseases affecting absenteeism are as follows: chronic fatigue or low energy, joint pain, musculoskeletal problems, chronic low back / neck pain, sleep problem, migraine-headache, anxiety disorder, depression, high blood pressure or hypertension, obesity, diabetes, asthma, cancer and heart diseases (Kandemir, 2014).

5. LIMITATIONS

There is no data on whether cancer patients are using drugs regularly, the stages of the disease, whether or not patients are applying to traditional complementary medicine in the Turkish Health Survey data. Therefore, there is no comparison in the literature regarding the factors affecting absenteeism. Besides, the lack

of data on organizational behavior parameters related to organizational and institutional factors, which are a source of risk for absenteeism, are among the limitations.

Although chronic health conditions are one of the determinants of absenteeism, numerous studies are pointing out that its impact on workplace productivity is weak. The main factors affecting the absenteeism are contextual factors such as culture, behavior, health services, macroeconomic conditions, legislation, institution design and income inequality (Baptista et al., 2019; Evans-Lacko & Knapp, 2016). Absenteeism is influenced by the characteristics of the individual as well as the nature and characteristics of work in the employment sectors (Ejebu & Skåtun, 2018).

6. CONCLUSION

Healthy working environments should be provided for the employees to perform well. Ensuring a healthy work environment should be among the primary objectives of its managers. Labor productivity is achieved through a healthy and productive workforce. Employee productivity is influenced by the quality of human resources. Particularly in organizations with a tendency to grow, absenteeism behaviors of employees may be an obstacle to achieve the goals. Policymakers should benefit from evidence-based on econometric models of the comparative burden of different chronic conditions.

REFERENCES

Bacharach, S. B., Bamberger, P., & Biron, M. (2010). Alcohol consumption and workplace absenteeism: The moderating effect of social support. Journal of Applied Psychology, 95(2), 334–348. doi:10.1037/a0018018

Baptista, M. C., Burton, W. N., Nahas, A. K., Wang, Y.-P., Viana, M. C., & Andrade, L. H. (2019). Absenteeism and Presenteeism Associated With Common Health Conditions in Brazilian Workers. Journal of Occupational and Environmental Medicine, 61(4), 303–313. doi:10.1097/JOM.0000000000001538

Bergström, G., Bodin, L., Hagberg, J., Aronsson, G., & Josephson, M. (2009). Sickness Presenteeism Today, Sickness Absenteeism Tomorrow? A Prospective Study on Sickness Presenteeism and Future Sickness Absenteeism. Journal of Occupational and Environmental Medicine, 51(6), 629–638. doi:10.1097/JOM.0b013e3181a8281b

Bierla, I., Huver, B., & Richard, S. (2013). New evidence on absenteeism and presenteeism. The International Journal of Human Resource Management, 24(7), 1536–1550. doi:10.1080/09585192.2012.722120

Brüggenjürgen, B., Rossnagel, K., Roll, S., Andersson, F. L., Selim, D., Müller-Nordhorn, J., Nolte, C. H., Jungehülsing, G. J., Villringer, A., & Willich, S. N. (2007). The Impact of Atrial Fibrillation on the Cost of Stroke: The Berlin Acute Stroke Study. Value in Health, 10(2), 137–143. doi:10.1111/j.1524-4733.2006.00160.x

Claxton, A. J., Chawla, A. J., & Kennedy, S. (1999). Absenteeism Among Employees Treated for depression. Journal of Occupational and Environmental Medicine, 41(7), 605–611. doi:10.1097/00043764-199907000-00009

Darr, W., & Johns, G. (2008). Work strain, health, and absenteeism: A meta-analysis. Journal of Occupational Health Psychology, 13(4), 293–318. doi:10.1037/a0012639

DeVol, R., Bedroussian, A., Charuworn, A., Chatterjee, A., Kim, I., Kim, S., & Klowden, K. (2007). An unhealthy America: The economic burden of chronic disease. CA:Milken Institute.

Drummond, M. F., Sculpher, M. J., Torrance, G. W., O'Brien, B. J., & Stoddart, G. L. (2005). Methods for the economic evaluation of health care programmes (Third). Oxford university press.

Ejebu, O.-Z., & Skåtun, D. (2018). Vocation, Mental Illness, and the Absenteeism Decision. Journal of Occupational and Environmental Medicine, 60(12), 1136–1142. doi:10.1097/JOM.0000000000001454

Emeç, H. (2002). Ege Bölgesi Tüketim Harcamaları İçin Sıralı Logit Tahminleri ve Senaryo Sonuçları. Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 4(2), 13–29.

Evans-Lacko, S., & Knapp, M. (2016). Global patterns of workplace productivity for people with depression: absenteeism and presenteeism costs across eight diverse countries. Social Psychiatry and Psychiatric Epidemiology, 51(11), 1525–1537. doi:10.1007/s00127-016-1278-4

Frone, M. R. (2008). Obesity and Absenteeism Among U.S. Workers: Do Physical Health and Mental Health Explain the Relation? Journal of Workplace Behavioral Health, 22(4), 65–79. doi:10.1080/15555240802157403

Gujarati, D. N. (2012). Basic Econometrics. Tata McGraw-Hill Education.

Halpern, M. T. (2001). Impact of smoking status on workplace absenteeism and productivity. Tobacco Control, 10(3), 233–238. doi:10.1136/tc.10.3.233

Hansen, C. L., Baelum, J., Skadhauge, L., Thomsen, G., Omland, Ø., Thilsing, T., Dahl, S., Sigsgaard, T., & Sherson, D. (2012). Consequences of asthma on job absenteeism and job retention. Scandinavian Journal of Public Health, 40(4), 377–384. doi:10.1177/1403494812449079

Hemp, P. (2004). Presenteeism: At work - But out of it. Harvard Business Review, 82(10), 49–58.

Kandemir, A. (2014). Hastane Çalışanları Arasında Sağlık Sorunları Nedeniyle Yaşanan İşte Var Olamama ve İşe Devamsızlık Davranışı ile Maliyetini Etkileyen Faktörlerin İncelenmesi. Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.

Kaşko, Y. (2007). Çoklu Bağlantı Durumunda İklili (Binary) Lojistik Regresyon Modelinde Gerçekleşen 1. Tip Hata ve Testin Gücü. Yayımlanmamış Yüksek Lisans Tezi, Ankara Üniversitesi, Fen Bilimleri Esntitüsü, Ankara.

Lakic, D., Tasic, L., & Kos, M. (2014). Economic burden of cardiovascular diseases in Serbia. Vojnosanitetski Pregled, 71(2), 137–143. doi:10.2298/VSP1402137L

Lyszczarz, B. (2018). Indirect costs and public finance consequences of heart failure in Poland, 2012–2015. BMC Public Health, 18(1), 1130. doi:10.1186/s12889-018-6034-0

Malinowski, K. P., Kawalec, P. P., & Moćko, P. (2016). Indirect costs of absenteeism due to rheumatoid arthritis, psoriasis, multiple sclerosis, insulin-dependent diabetes mellitus, and ulcerative colitis in 2012: a study based on real-life data from the Social Insurance Institution in Poland. Expert Review of Pharmacoeconomics & Outcomes Research, 16(2), 295–303. doi:10.1586/14737167.2016.1085802

Mesas, A. E., González, A. D., Mesas, C. E., de Andrade, S. M., Magro, I. S., & del Llano, J. (2014). The Association of Chronic Neck Pain, Low Back Pain, and Migraine with Absenteeism Due to Health Problems in Spanish Workers. Spine, 39(15), 1243–1253. doi:10.1097/BRS.0000000000000387

Prottas, D. J. (2008). Perceived Behavioral Integrity: Relationships with Employee Attitudes, Well-Being, and Absenteeism. Journal of Business Ethics, 81(2), 313–322. doi:10.1007/s10551-007-9496-z

Richardson, K. L., Weiss, N. S., & Halbach, S. (2018). Chronic School Absenteeism of Children with Chronic Kidney Disease. The Journal of Pediatrics, 199(S4), 267–271. doi:10.1016/j.jpeds.2018.03.031

Wang, V., Vilme, H., Maciejewski, M. L., & Boulware, L. E. (2016). The Economic Burden of Chronic Kidney Disease and End-Stage Renal Disease. Seminars in Nephrology, 36(4), 319–330. doi:10.1016/j.semnephrol.2016.05.008

Wee, L. H., Yeap, L. L. L., Chan, C. M. H., Wong, J. E., Jamil, N. A., Swarna Nantha, Y., & Siau, C. S. (2019). Anteceding factors predicting absenteeism and presenteeism in urban area in Malaysia. BMC Public Health, 19(S4), 540. doi:10.1186/s12889-019-6860-8

Zhang, W., McLeod, C., & Koehoorn, M. (2016). The relationship between chronic conditions and absenteeism and associated costs in Canada. Scandinavian Journal of Work, Environment & Health, 42(5), 413–422. doi:10.5271/sjweh.3583

Appendix 1. Variable Table

Variables	Variable description	Data Source
Age	15-75 age	TurkStat, The micro data set of the 2016 Health Survey
Education level	1=He/She didn't finish any school, Illiterate 2=Primary School 3=Secondary School 4=Vocational or Technical Secondary School 5=Primary education 6=High school or vocational high school 7=2 or 3-year college 8=4-year college or faculty 9=Master's Degree (5 or 6-year faculties included) 10=PhD	
Household income	1=0 - 1264 TL 2=1265- 1814 TL 3=1815- 2540 TL 4=2541 - 3721 TL 5=3722 + TL	
Gender	1=Male 0=Female	
Alcohol use	1=Yes 0=No	
Cigarette smoking	1=Never 2=I quit smoking 3=Yes, sometimes 4=Evet, everyday	
Sport	1= At least 1 day a week and 10 minutes 0= I have never performed such physical activity	
Walking	1= At least 1 day a week and 10 minutes 0= I have never performed such physical activity	
Body mass index	14.69-53.33	
Work status	1= Salaried or Paid 2= Employer 3= On one's own 4= Unpaid family worker	
Continuity of employment	1= Permanent 0= Temporary or limited time work (seasonal, contracted, non-contract occasional work included)	
Working method	1=Full time 0=Part time	
General health status	1=Too bad 2=Bad 3=Normal 4=Good 5=Very good	
Prevention of life in 4 weeks of pain	1=Never 2=Very little 3=normal 4=pretty much 5=Too much	
Asthma	1= Yes 0= No	
Bronchitis		
Coronary heart		
Hypertension		
Stroke-paralysis		
Arthrosis		
Waist area problems		
Neck area problems		
Diabetes		
Allergies		
Liver failure		
Kidney		
Depression		