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INVESTIGATING FACTORS AFFECTING ABSENTEEISM DUE TO HEALTH PROBLEMS USING COUNT DATA MODELS

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ABSTRACT

This study aims to determine the factors affecting the number of days individuals are absent from work due to health problems in the last 12 months by using the Poisson Regression Model, Negative Binomial Regression Model, Zero-Inflated Poisson Regression Model, and Zero-Inflated Negative Binomial Regression Model using the micro data sets of the Türkiye Health Survey conducted by the Turkish Statistical Institute in 2022. The model results indicate that the variables of age, marital status, education level, general health status, occupation, receiving psycho-social support health services from primary health care institutions, illness lasting/expected to last 6 months, and hypertension in the last 12 months are significant. It was found that women were absent from work more days than men, that the number of days individuals were absent from work decreased as their age increased, and that individuals were absent from work more as their general health worsened.

Keywords: *Absenteeism, Count Data, Zero- Inflated Negative Binomial Regression.*

JEL Codes: *C25, C35, C40, C44.*

1. INTRODUCTION

Improving individual health on a global level is a very important social goal with direct benefits for longer and better lives (Acemoglu & Johnson, 2007). These improvements influence the rate of income growth through various channels. For instance, better health directly enhances labor market participation and worker productivity (Antczak & Miszczynska, 2021). Furthermore, increased life expectancy creates incentives to invest in education, innovation, human capital, and physical capital (Bloom, Canning, & Graham, 2003). As stated in human capital theory, human capital is utilized in the production of gross domestic product (GDP) (Becker, 1993). Sick leave resulting from illness leads directly to the underutilization of an individual's capital, causing a reduction in the individual's productivity and contributing to unproduced GDP (Jones, 2020). Thus, illness leads to a reduction in work resources and limited productivity. Consequently, illness imposes direct and indirect costs on the economy and society (Oliva, Lobo, Lopez-Bastida, Zozaya, & Romay, 2005). Components of indirect

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costs include absenteeism (Hultin, Lindholm, Malfert, & Möller, 2012). Absenteeism due to health issues constitutes the main category of employee absenteeism (Antczak & Miszczynska, 2021).

The reason an employee takes leave due to health problems is the work capacity insufficiency caused by the illness (Striker & Kusideł, 2018). Even though it is commonly assumed that only health-related factors cause sick leave, this is not completely true. Absenteeism due to health issues is a highly complex and diverse phenomenon. Many factors play a determinant role in the causes, frequency, and duration of absenteeism due to health problems (Antczak & Miszczynska, 2021). A study categorized the factors influencing absenteeism due to health problems into three levels: macro, organizational, and individual (Whitaker, 2001). In another study, the determinants of absenteeism due to health problems were grouped into four main categories: health and quality of life factors (e.g., living conditions, nutrition, welfare, lifestyle), demographic factors, economic factors (e.g., income, national economy, poverty), and labor market conditions (e.g., education level, industry sector, unemployment, workplace) (Striker & Kusideł, 2018). On the other hand, Vuorio et al. (2019) classified the factors influencing absenteeism into three different categories and emphasized that various sociodemographic, health-related, and job-related risk factors influence absenteeism originating from health problems (Vuorio, Suominen, Korhonen, & Kautiainen, 2019).

Studies on the development of absenteeism originating from health problems are carried out in different ways. Some researchers focus on examining absenteeism originating from health problems from the perspective of costs borne by the employer and the economic and organizational consequences covered by the company. Another approach focuses on analyzing the development of illness from the aspects of employee age, education, or gender. Moreover, studies were carried out considering cultural determinants (Antczak & Miszczynska, 2021). Previous studies reported that common mental disorders, such as depression or adjustment disorders, are among the main reasons for absenteeism due to health problems in many countries (Keus Van De Poll et al., 2020; OECD, 2015). In a previous study, the relationship between psychosocial factors and absenteeism due to health problems was examined, and the researchers identified the factors related to the labor market and company activities (Slany et al., 2014). Some studies also examined the relationship between occupational status and absenteeism due to health problems (Slany et al., 2014; Whitaker, 2001; Laaksonen et al., 2010).

Previous studies examined the relationship between absenteeism due to health problems and factors such as age (Vuorio, Suominen, Korhonen, & Kautiainen, 2019; Vlasveld et al., 2013), education (Thorsen et al., 2019; Keus Van De Poll et al., 2020), gender (Thorsen et al., 2019; Kristensen, Jensen, Kreiner, & Mikkelsen, 2010), marital status (Raynik, König, & Hajek, 2020), parenthood (Keus Van De Poll et al., 2020), and race and ethnicity (Hassan, Wright, & Yuki, 2014). On the other hand, some studies investigated the relationship between factors related to health and lifestyle and absenteeism due to health problems (Keus Van De Poll et al., 2020; Rabacow et al., 2014). These studies addressed various determinants, such as general health and sleep problems (Rabacow et al., 2014; Raynik, König,

and Hajek, 2020), mortality rates (Vahtera, Pentti, & Kivimäki, 2004), body mass index (Rabacow et al., 2014; Brox and Froøystein, 2005), and the COVID-19 pandemic (Kalenkoski, 2020).

Mental health issues and chronic illnesses are among the most common reasons for absenteeism due to health problems (Vuorio, Suominen, Korhonen, and Kautiainen, 2019; Vahtera, Pentti, and Kivimäki, 2004). Another group of factors is related to quality of life (Anagnostopoulos and Niakas, 2010). As part of these factors, the literature addresses factors such as physical activity (Brox & Froøystein, 2005), job satisfaction (Vuorio, Suominen, Korhonen, and Kautiainen, 2019; Brox and Froøystein, 2005), financial satisfaction (Vuorio, Suominen, Korhonen, & Kautiainen, 2019), and social support (Casini, Godin, Clays, and F., 2013). Determinants in the field of social policy also constitute an important group of factors influencing absenteeism originating from health problems (Antczak and Miszczynska, 2021; Sjöberg, 2017). The present study aims to identify factors influencing the number of absenteeism days due to health problems by using count data models, specifically the Poisson Regression Model, Negative Binomial Regression Model, Zero-Inflated Poisson Regression Model, and Zero-Inflated Negative Binomial Regression Model.

2. LITERATURE REVIEW

In the literature, there are many studies carried out on absenteeism due to health issues (Doki, Sasahara, Hirai, Oi, and Matsuzaki, 2016; Reis et al., 2011; Glise, Hadzibajramovic, Jonsdottir, G, and Ahlborg, 2010). Empirical studies revealed that women are absent from work more frequently than men (Bryan, Bryce, & Roberts, 2021). This phenomenon is often attributed to occupational differences (Laaksonen et al., 2010; Mastekaasa and Melsom, 2014), and it was suggested that biological factors may also influence the higher absenteeism rates among women (Avdic & Johansson, 2013).

It was found in a study that job stress disproportionately affects absenteeism due to health issues among women (Mortensen et al., 2017). Furthermore, some studies suggested that absenteeism originating from health problems is more prevalent among parents with young children (Bridges and Mumford, 2001; Bryan, Bryce, and Roberts, 2021). Another study identified work-related stress (Brunner, Igic, Keller, & Wieser, 2019), commuting time (Giminez-Nadal, Molina, & Velilla, 2018), and unsafe or hazardous working conditions (Ose, 2005) as triggers for absenteeism (Bryan, Bryce, & Roberts, 2021). Moreover, adverse working conditions and job dissatisfaction were reported to predict absenteeism due to health issues (Bockerman & Ilmakunnas, 2008). Supportive behaviors of supervisors and acknowledging the efforts of employees were highlighted as factors that can help reduce absenteeism (Brunner, Igic, Keller, & Wieser, 2019).

Furthermore, it can be seen that studies also identified employees' expectations of returning to work after health-related absenteeism as a significant predictor (Volker, Zijlstra-Vlasveld, Brouwers, & Lomwel, 2015). Similarly, earlier studies revealed that personal factors are important predictors of return to work (Nieuwenhuijsen, Noordik, Dijk, and Klink, 2016; Vlasveld et al., 2012). As emphasized in

some studies, coping is another personal factor considered important during sick leave and the return-to-work process, and an active coping style is associated with shorter sick leave and earlier return to work (Huijs, Koppes, Taris, and Blonk, 2012; Van, Schaufeli, Dijk, and Blonk, 2008). Previous studies also emphasized the significant roles of employers and managers in the return-to-work process (Holmlund, Ljungberg, Bültmann, and Brämberg, 2024). Managers are expected to be well-informed about policies and procedures, maintain effective communication and contact with employees during sick leave and the return-to-work process, and follow up on the employee's return-to-work plan (Corbiere et al., 2020; Holmlund, Ljungberg, Bültmann, and Brämberg, 2024). Some studies also noted that good communication between managers and employees is very important for the return-to-work process (Nielsen and Yarker, 2023; Ladegaard, Skakon, Elrond, and Netterstrøm, 2019). Moreover, managers' knowledge and experience regarding organizational policies related to return to work were identified as supportive factors in the process (Ladegaard, Skakon, Elrond, & Netterstrøm, 2019).

Reviewing the literature, it can be seen that numerous studies examined the occupational reintegration of employees who are absent due to mental health issues (St-Arnaud, Bourbonnais, Saint-Jean, and Rhéaume, 2007; Briand, 2007). Studies on this subject primarily focused on individual-centered cognitive-behavioral interventions, including problem-solving and stress management (Nystuen & Hagen., 2003). However, it is becoming gradually more necessary to consider job-related variables in the analysis of the occupational reintegration process (St-Arnaud, Bourbonnais, Saint-Jean, & Rhéaume, 2007) since many studies reported a correlation between work-related psychosocial constraints and the development of mental health issues, measured by psychological distress or absenteeism (Rugulies and Burr, 2006; Siegrist and Marmot, 2004).

There are many different reasons for absenteeism. In the relevant literature review, it is seen that the reasons in question can be examined in three ways: individual, organizational and environmental reasons. In addition, when the studies investigating the issue of absenteeism are examined, it is seen that it is stated that the demographic characteristics of the employees, their personal excuses and their illnesses cause absenteeism in different ways and to different extents. To our knowledge, this study is the first known study to examine the factors affecting the number of days those individuals are absent from work due to health problems in a Turkish sample using count data models. In this context, the results of this study can fill the gap in the existing literature in terms of using count data models.

3. MATERIAL AND METHOD

3.1. Data

The dataset used in this study was obtained from the 2022 Türkiye Health Survey conducted by the Turkish Statistical Institute (TurkStat). A stratified two-stage cluster sampling method was utilized to gather the data (TurkStat, 2022).

This study used data from 9,069 individuals aged 15 years and older, who participated in the 2022 Türkiye Health Survey.

3.2. Variables

The dependent variable in this study is the number of days absent from work (work absenteeism days), measured by the question in the microdata set of the Türkiye Health Survey: "How many days in total did you miss work due to health problems in the last 12 months?"

The independent variables included in this study are those available in the Türkiye Health Survey and were selected based on a comprehensive literature review. These independent variables are: age (34 and under, 35–44, 45–54, and 55+), gender (female, male), marital status (never married, married, divorced/widowed), employment status (full-time, part-time), educational level (illiterate/no formal education, elementary school, middle school, high school, and university), general health status (very good/good, fair, poor/very poor), occupation (managers, professionals, technicians/technologists/associate professionals, clerical support workers, service/sales workers, skilled agricultural/forestry/fishery workers, crafts/trades workers, plant/machine operators/assemblers, elementary occupations), receipt of psychosocial support services from primary healthcare facilities (yes, no), presence of an illness lasting or expected to last 6 months or longer (yes, no), incidence of heart attack in the last 12 months (yes, no), incidence of hypertension in the last 12 months (yes, no), incidence of substance use-related illnesses in the last 12 months (yes, no), and incidence of depression in the last 12 months (yes, no).

Table 1 presents descriptive statistics for the dependent and independent variables. Reference categories for the independent variables were selected by making use of the best-fit model. Ordinal and nominal variables were defined as dummy variables to observe the effects of all categories of the variables included in the model (Alkan and Ünver, 2020; Ünver, Aydemir, andAlkan, 2023).

The primary requirement for count models is that the dependent variable must be the count data (Üç Doğruk Birecikli et al., 2021). In this study, the dependent variable, the number of work absenteeism days, consists of non-negative integers. It can be seen in Table 3.1 that the dependent variable ranges between a minimum of 0 and a maximum of 365 days absent from work in the last 12 months. Notably, 86.30% of the work absenteeism days are zero. The present study revealed that 7,827 individuals reported no absenteeism, while 2,142 individuals reported one or more days of absenteeism. The mean of the dependent variable is 3.195, and its variance is 344.114. Moreover, 30.2% of the participants are women. Regarding educational level, 23.4% of the participants are primary school graduates, whereas 34.2% are university graduates. Besides that, 4.9% of individuals work part-time. Additionally, it was determined that 11.2% of individuals are employed in elementary occupations. It was also found that 71.9% of the participants are married, and 0.9% of the participants experienced a heart attack in the last 12 months.

Table 1. Descriptive Statistics

Variables	Mean	Min	Max
Discontinuing the work	3.195	0	365
Age			
35-44	0.319	0	1
45-54	0.222	0	1
55 and older	0.092	0	1
Sex			
Female	0.302	0	1
Marital status			
Married	0.719	0	1
Widow/Divorced	0.056	0	1
Educational level			
Elementary	0.234	0	1
Secondary	0.143	0	1
High school	0.252	0	1
University	0.342	0	1
Occupation			
Professional occupation members	0.189	0	1
Technicians/technologists/associate professionals	0.093	0	1
Office service workers	0.065	0	1
Service/sales workers	0.182	0	1
Qualified agricultural/forestry/aquaculture workers	0.067	0	1
Craftsmen / relevant workers	0.128	0	1
Facility-machine operators/assemblers	0.088	0	1
Unqualified workers	0.112	0	1
General health status			
Moderate	0.227	0	1
Poor/Very poor	0.026	0	1
Disease status			
No	0.428	0	1
Heart attack history			
No	0.009	0	1
Hypertension history			
No	0.073	0	1
Disease originating from substance abuse			
No	0.000	0	1
Depression history			
No	0.049	0	1
Employment type			

Part-time	0.049	0	1
Receiving psychological support			
No	0.040	0	1

3.3. Statistical Analysis

One of the fundamental areas of statistical analysis is the testing of statistical hypotheses (Ünver and Alkan, 2022). The data analysis was conducted by using SPSS 20 and Stata 14 software. This study employed regression models constructed with count data. Count models are regression models in which the dependent variable is a discrete variable. Regression models constructed with count data are used for special cases where the dependent variable takes only non-negative integer values, with the minimum value being zero (Verbeek, 2004; Hilbe, 2014). Many models in the literature consider the characteristics of count data. Among the commonly used models are the Poisson Regression Model and the Negative Binomial Regression Model (Cameron and Trivedi, 2013). When the count data for the dependent variable has an excess number of zero values, zero-inflated models that consider these zero values should be used. There are various methods in the literature for analyzing zero-inflated count data. The Zero-Inflated Poisson Regression Model and the Zero-Inflated Negative Binomial Regression Model are among the widely used models (Üçdoğruk Birecikli et al., 2021). In this study, factors affecting the number of days individuals were absent from work due to health problems in the last 12 months were identified using the Poisson Regression Model, Negative Binomial Regression Model, Zero-Inflated Poisson Regression Model, and Zero-Inflated Negative Binomial Regression Model.

3.4. Model Estimation

To identify the factors affecting the number of days individuals were absent from work due to health problems, the Poisson Regression Model, Negative Binomial Regression Model, Zero-Inflated Poisson Regression Model, and Zero-Inflated Negative Binomial Regression Model were used. The comparison criteria for the models used in the study are presented in Table 2. As seen in Table 2, the Zero-Inflated Negative Binomial Regression Model, which has the lowest AIC and BIC values among the established models, was identified as the best model. Therefore, only the analysis results of the best model were interpreted in the study.

Table 2. Comparison of Established Models

Criteria	Poisson Regression	Negative Binomial Regression	Zero-Inflated Poisson Regression Model	Zero-Inflated Negative Binomial Regression Model
AIC	16.198	1.890	6.187	1.879
BIC	64550.397	-65204.867	-26194.614	-65260.645
Prob	0,0000	0,0000	0.0000	0.0000
McFadden's R^2	0.149	0.014	0.133	0.013

Examining the estimation results of the Zero-Inflated Negative Binomial Regression Model presented in Table 2, it was found that the variables including age (45–54 and 55+), marital status (married, divorced/widowed), educational level (high school, university), general health status (very good/good, fair, poor/very poor), occupation, receipt of psycho-social support health services from primary healthcare institutions, presence of a disease lasting or expected to last for 6 months or more, and the presence of hypertension within the last 12 months were statistically significant.

Table 3. Estimation Results for the Coefficients of Established Models

Variables	Poisson Regression	Negative Binomial Regression	Zero-Inflated Poisson Regression Model	Zero-Inflated Negative Binomial Regression Model
	Coefficient	Coefficient	Coefficient	Coefficient
Sex (reference: Male)				
Female	-0.051[a] (0.014)	0.033 (0.141)	0.100[a] (0.014)	0.165 (0.106)
Age (reference: 34 and younger)				
35-44	-0.133[a] (0.015)	-0.186 (0.159)	0.014 (0.016)	-0.043 (0.113)
45-54	-0.531[a] (0.018)	-0.551[a] (0.188)	-0.113[a] (0.019)	-0.318[b] (0.141)
55 and older	-0.782[a] (0.026)	-0.795[a] (0.254)	-0.180[a] (0.027)	-0.454[b] (0.198)
Marital status (reference: Never married)				
Married	0.465[a] (0.0189)	0.340[b] (0.166)	0.366[a] (0.019)	0.339[a] (0.123)
Divorced/Widow	0.681[a] (0.027)	0.438 (0.294)	0.421[a] (0.028)	0.416[b] (0.210)
Educational level (reference category: Illiterate / Never graduated)				
Elementary	-0.489[a] (0.027)	-0.117 (0.360)	-0.581[a] (0.028)	-0.436 (0.311)
Secondary	-0.466[a] (0.030)	0.054 (0.376)	-0.553[a] (0.030)	-0.411 (0.320)
High school	-0.496[a] (0.029)	-0.011 (0.378)	-0.717[a] (0.029)	-0.569[c] (0.319)
University	-0.387[a] (0.031)	0.062 (0.391)	-0.674[a] (0.031)	-0.567[c] (0.329)
Occupation (reference: Managers)				
Professional occupation members	0.556[a] (0.037)	0.647[b] (0.250)	0.378[a] (0.037)	0.458[b] (0.195)
Technicians/technologists/associate professionals	1.064[a] (0.037)	1.159 (0.279)	0.624[a] (0.038)	0.843[a] (0.210)
Office service workers	1.092[a] (0.039)	1.127 (0.305)	0.730[a] (0.039)	0.821[a] (0.224)
Service/sales workers	0.698[a] (0.037)	0.626[b] (0.254)	0.668[a] (0.037)	0.619[a] (0.205)
Qualified agricultural/ forestry/aquaculture workers	0.369[a] (0.043)	0.502 (0.326)	0.933[a] (0.043)	0.873[a] (0.295)
Craftsmen / relevant workers	0.918[a] (0.038)	0.863[a] (0.276)	0.587[a] (0.038)	0.644[a] (0.216)
Facility-machine operators/assemblers	0.819[a] (0.040)	0.895[a] (0.293)	0.431[a] (0.040)	0.589[a] (0.225)
Unqualified workers	0.658[a] (0.038)	0.999[a] (0.284)	0.487[a] (0.039)	0.796[a] (0.223)
General health status (reference: Very good/Good)				
Moderate	0.587[a] (0.015)	0.639[a] (0.168)	0.341[a] (0.015)	0.434[a] (0.114)
Poor/Very poor	1.614[a] (0.021)	1.820[a] (0.371)	0.942[a] (0.021)	1.246[a] (0.215)
Disease history (reference: Yes)				
No	0.821[a] (0.017)	0.790[a] (0.148)	0.170[a] (0.016)	0.324[a] (0.110)
Heart attack history (reference: Yes)				
No	0.364[a] (0.036)	0.774 (0.582)	0.101[a] (0.036)	0.337 (0.335)
Hypertension history (reference: Yes)				

No	0.190[a] (0.018)	0.278 (0.241)	0.178[a] (0.018)	0.330[b] (0.164)
Disease originating from substance abuse (reference: Yes)				
No	1.731[a] (0.098)	1.613 (3.719)	0.786[a] (0.100)	0.931 (1.588)
Depression history (reference: Yes)				
No	0.393[a] (0.018)	0.508[c] (0.280)	0.088[a] (0.018)	0.247 (0.165)
Employment type (reference: Full time)				
Part-time	-0.268[a] (0.029)	-0.633[b] (0.274)	-0.010 (0.029)	-0.227 (0.228)
Receiving psychological support (reference: Yes)				
No	0.597[a] (0.020)	0.638[b] (0.311)	0.289[a] (0.020)	0.32[c] (0.186)
Constant Term	-0.169[a] (0.048)	-0.581 (0.454)	2.529[a] (0.048)	1.932[a] (0.387)

[a]$p < .01$; [b]$p < .05$; [c]$p < .10$

*: Values in parentheses indicate standard errors.

Table 3 shows that the coefficient values only provide information on the direction of the relationship between dependent and independent variables (Karaaslan, 2021). Therefore, the interpretations of the models are based on the marginal effects calculated in Table 4.

Table 4. Marginal Effects of the Models

Variables	Poisson Regression	Negative Binomial Regression	Zero-Inflated Poisson Regression Model	Zero-Inflated Negative Binomial Regression Model
	M.E	**M.E**	**M.E**	**M.E**
Sex (reference: Male)				
Female	-0.163[a] (0.043)	0.112 (0.476)	0.519[a] (0.179)	0.609[c] (0.339)
Age (reference: 34 and younger)				
35-44	-0.516[a] (0.060)	-0.753 (0.663)	0.042 (0.048)	-0.137 (0.362)
45-54	-1.705[a] (0.061)	-1.878[a] (0.696)	-0.319[a] (0.054)	-0.890[b] (0.401)
55 and older	-2.247[a] (0.068)	-2.431[a] (0.773)	-0.493[a] (0.073)	-1.194[b] (0.489)
Marital status (reference: Never married)				
Married	1.264[a] (0.045)	1.018[b] (0.466)	0.939[a] (0.155)	0.749[b] (0.297)
Divorced/Widow	2.086[a] (0.096)	1.383 (1.048)	1.687[a] (0.408)	1.507[b] (0.728)
Educational level (reference category: Illiterate / Never graduated)				
Elementary	-1.897[a] (0.126)	-0.370 (1.195)	-2.295[a] (0.149)	-1.598 (1.369)
Secondary	-1.828[a] (0.133)	0.187 (1.275)	-2.211[a] (0.152)	-1.526 (1.393)
High school	-1.920[a] (0.132)	-0.037 (1.267)	-2.664[a] (0.155)	-1.964 (1.392)
University	-1.576[a] (0.139)	0.216 (1.329)	-2.554[a] (0.159)	-1.959 (1.417)
Occupation (reference: Managers)				
Professional occupation members	1.152[a] (0.069)	1.367[b] (0.529)	0.75[a] (0.071)	0.854[b] (0.344)
Technicians/technologists/associate professionals	2.939[a] (0.092)	3.286[a] (0.985)	1.415[a] (0.085)	1.950[a] (0.504)
Office service workers	3.068[a] (0.106)	3.137[a] (1.112)	1.755[a] (0.099)	1.873[a] (0.565)
Service/sales workers	1.565[a] (0.070)	1.307[b] (0.510)	1.550[a] (0.084)	1.261[a] (0.393)
Qualified agricultural/ forestry/aquaculture workers	0.692[a] (0.080)	0.981 (0.691)	2.516[a] (0.142)	2.053[b] (0.873)
Craftsmen / relevant workers	2.33[a] (0.082)	2.060[a] (0.698)	1.302[a] (0.082)	1.331[a] (0.433)
Facility-machine operators/assemblers	1.966[a] (0.089)	2.175[a] (0.819)	0.881[a] (0.080)	1.182[b] (0.456)

Unqualified workers	1.441[a] (0.075)	2.578[a] (0.838)	1.025[a] (0.079)	1.792[a] (0.515)
General health status (reference: Very good/Good)				
Moderate	1.786[a] (0.051)	1.986[a] (0.613)	0.994[a] (0.054)	1.219[a] (0.354)
Poor/Very poor	9.008[a] (0.199)	11.475[b] (4.880)	3.829[a] (0.158)	5.556[a] (1.581)
Disease history (reference: Yes)				
No	2.373[a] (0.046)	2.363[a] (0.465)	0.483[a] (0.047)	0.889[a] (0.295)
Heart attack history (reference: Yes)				
No	1.389[a] (0.161)	3.813 (4.106)	0.303[a] (0.113)	1.121(1.306)
Hypertension history (reference: Yes)				
No	0.651[a] (0.067)	1.030 (0.995)	0.546[a] (0.062)	1.054[c] (0.598)
Disease originating from substance abuse (reference: Yes)				
No	14.795[a] (1.764)	13.427 (62.315)	3.417[a] (0.632)	4.331 (11.340)
Depression history (reference: Yes)				
No	1.453[a] (0.079)	2.042 (1.380)	0.261[a] (0.056)	0.768 (0.567)
Employment type (reference: Full time)				
Part-time	-0.762[a] (0.073)	-1.617[a] (0.565)	-0.029 (0.082)	-0.580 (0.527)
Receiving psychological support (reference: Yes)				
No	2.461[a] (0.106)	2.790 (1.800)	0.942[a] (0.077)	1.038 (0.691)

[a]$p < .01$; [b]$p < .05$; [c]$p < .10$, M.E: Marginal Effect

*: Values in parentheses indicate standard errors.

As obtained from the Zero-Inflated Negative Binomial Regression model in Table 4, women have on average 0.609 more days of absenteeism in comparison to men. According to the study, individuals aged 45-54 have 0.890 fewer absenteeism days in comparison to the reference group. Similarly, individuals aged 55 and older have on average 1.194 fewer absenteeism days than the reference group. Examining Table 3.4, married individuals have on average 0.749 more absenteeism days in comparison to those who have never married. Similarly, individuals who are divorced or widowed have 1.507 more absenteeism days than those who have never married.

As seen in Table 4, individuals in professional occupations have on average 0.854 more absenteeism days in comparison to those in managerial positions. Technicians/Associate Professionals have on average 1.950 more absenteeism days than managers. Office support workers have 1.873 more absenteeism days than managers. Service and sales workers have on average 1.261 more absenteeism days than managers. Skilled agricultural, forestry, and fishery workers have 2.053 more absenteeism days in comparison to managers. Craftsmen and related workers have 1.331 more absenteeism days than managers. Facility-machine operators/assemblers have on average 1.182 more absenteeism days in comparison to managers. Individuals in elementary occupations have 1.792 more absenteeism days than those in managerial positions.

Table 4 shows that an individual with a moderate general health status has on average, 1.219 more days of absenteeism than an individual with a very good/good general health status. Additionally, as

seen in Table 4, an individual with poor/very poor general health has on average, 5.556 more days of absenteeism in comparison to an individual with very good/good general health. The present study also revealed that an individual without a chronic illness lasting or expected to last 6 months or longer has, on average, 0.889 more days of absenteeism than an individual with such an illness. As seen in Table 4, an individual who experienced hypertension in the last 12 months has, on average, 1.054 more days of absenteeism in comparison to an individual who did not experience hypertension in the same period.

4. DISCUSSION AND CONCLUSION

This study utilized microdata from the 2022 Türkiye Health Survey conducted by TurkStat (Turkish Statistical Institute). The present study aims to identify factors influencing the number of absenteeism days due to health problems by using count data models, specifically the Poisson Regression Model, Negative Binomial Regression Model, Zero-Inflated Poisson Regression Model, and Zero-Inflated Negative Binomial Regression Model. The analysis results indicate that the variables age (45–54 and 55+), marital status (married, divorced/widow), education level (high school and university), general health status (very good/good, moderate, poor/very poor), occupation, receiving psychosocial support services from primary healthcare facilities, presence of chronic illness lasting or expected to last 6 months or longer, and experiencing hypertension in the last 12 months are significant.

It was found in this study that women have more days of absenteeism compared to men. This result is consistent with those reported in some other studies (Egan, 2011; Ichino and Moretti, 2009). This phenomenon was associated with menstrual cycles in some studies (Ichino and Moretti, 2009; Patton and Johns, 2007). As found in this study, the number of absenteeism days decreases as individuals age. Similar results were reported in other studies (Bierla, Huver, and Richard, 2013; Ramsey, Punnett, and Greenidge, 2008). However, some studies linked increased absenteeism with aging to the increase in health issues (Ünsal, Demir, Özkan, and Arslan, 2011; Şahin, Kurutkan, and Kara, 2020; Sönmez et al., 2007). Elders experience age-related physiological changes, and adverse health conditions tend to develop with age (Ünver, Tekmanlı, and Alkan, 2023). It was also indicated in a previous study that as people age, they tend to pay more attention to their health (Alkan and Ünver, 2022).

It was concluded in this study that the number of absenteeism days significantly varies with marital status. It was found that married individuals or those who are widows/divorced have more absenteeism in comparison to individuals who have never been married. Some studies also identified marital status as a sociodemographic factor influencing absenteeism (Şahin, Kurutkan, and Kara, 2020; Obiero, Mwebi, and Nyang'ara, 2017). Similarly, it was reported in another study that single employees have fewer absenteeism days in comparison to married employees with children (Bacak & Yiğit, 2010). It was reported in their study that individuals have more absenteeism days as their general health deteriorates. Similar results were emphasized in other studies (Şahin, Kurutkan, and Kara, 2020; Küçük, Özbek, and Küçük, 2015). A study carried out in Ağrı and Gümüşhane revealed that health-related loss

of workforce has a significant and positive impact on the performance of businesses (Küçük, Özbek, and Küçük, 2015).

The present study revealed that individuals without a health condition lasting or expected to last six months or more had higher rates of absenteeism in comparison to those with a long-term health condition of six months or more. Similar results were reported in other studies (Vlasveld et al., 2012; Dekkers-Sanchez, Hoving, Sluiter, and Frings-Dresen, 2008). The present study also showed that individuals who experienced hypertension in the past 12 months had higher absenteeism in comparison to those who did not experience hypertension in the same period. These results are consistent with existing literature (Antczak and Miszczynska, 2021; Boon, Belschak, Den Hartog, and Pijnenburg, 2014).

It was found that individuals in the professional occupation category exhibited higher absenteeism than those in managerial positions. The study also revealed that technicians, technical professionals, and associate professionals had higher absenteeism rates in comparison to those in managerial positions. Similarly, office support workers had higher absenteeism in comparison to managers. Service and sales workers, as well as skilled agricultural, forestry, and aquaculture workers, were also found to have higher absenteeism rates than those in managerial roles. Craftsmen and related workers, facility-machine operators, assemblers, and unqualified workers all exhibited higher rates of absenteeism in comparison to managerial staff. As educational attainment decreases, individuals are more likely to work in unskilled jobs and face many risks such as low wages and poor living conditions. Educated individuals, possessing more knowledge and skills, are more likely to secure job security, which makes them less vulnerable to market adversities and improves their overall well-being, thereby contributing to their job attendance (Ünver and Alkan, 2020). Higher levels of education and knowledge increase the capacity and authority for personal initiative, responsibility, and autonomous decision-making and implementation. In such cases, reducing monotony and fatigue among employees helps them adapt to their jobs, which in turn reduces absenteeism (Küçük, Özbek, and Küçük, 2015).

Absenteeism due to health issues, i.e., sick leave, is a burden for employers and leads to productivity loss. Each illness generates various types of costs, including direct, indirect, and social costs. The magnitude of indirect costs is associated with productivity loss related to early withdrawal from the labor market, absenteeism, and presenteeism, and this phenomenon has become a subject of research and analysis not only in economics but also in medicine and social sciences. Studies on this subject address various factors that determine the development of absenteeism due to health issues.

A better understanding of absenteeism due to health problems is very important in many countries. Identifying modifiable risk factor targets related to this situation, and understanding, improving, and extending working lives by addressing sociodemographic factors affecting absenteeism due to health problems are also critically important. Finally, the results obtained in this study could provide a better

understanding of the potential sources and mechanisms behind the factors affecting absenteeism due to health issues, thus offering insights for policies and interventions aiming to reduce sick leave in the labor market, and informing doctors who approve sick leave.

Future studies may analyze factors related to having children, caring for them, state support for single mothers, or factors affecting sick leave during pregnancy.

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